



THE RESOURCE FOR INFORMATION EXECUTIVES

Dow Jones CIO Bill Godfrey's plan is to get his enterprise architecture to "bite into planning, project processes and culture."

**SHARING DATA,
SAVING LIVES**

Secrets for making health information networks work
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**THE GREENING
OF OPEN SOURCE**

As free code becomes increasingly available, CIO communities evolve to make it safer to use
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The New ENTERPRISE ARCHITECTURE

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» More Flexible » More Manageable » Clearer ROI
And the Ultimate Key to Alignment BY CHRISTOPHER KOCH

PLUS

How to Hire the
Best Enterprise
Architect

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**“WE DIDN’T BUILD THIS
I.T. SYSTEM.
IT JUST KINDA GREW.”**



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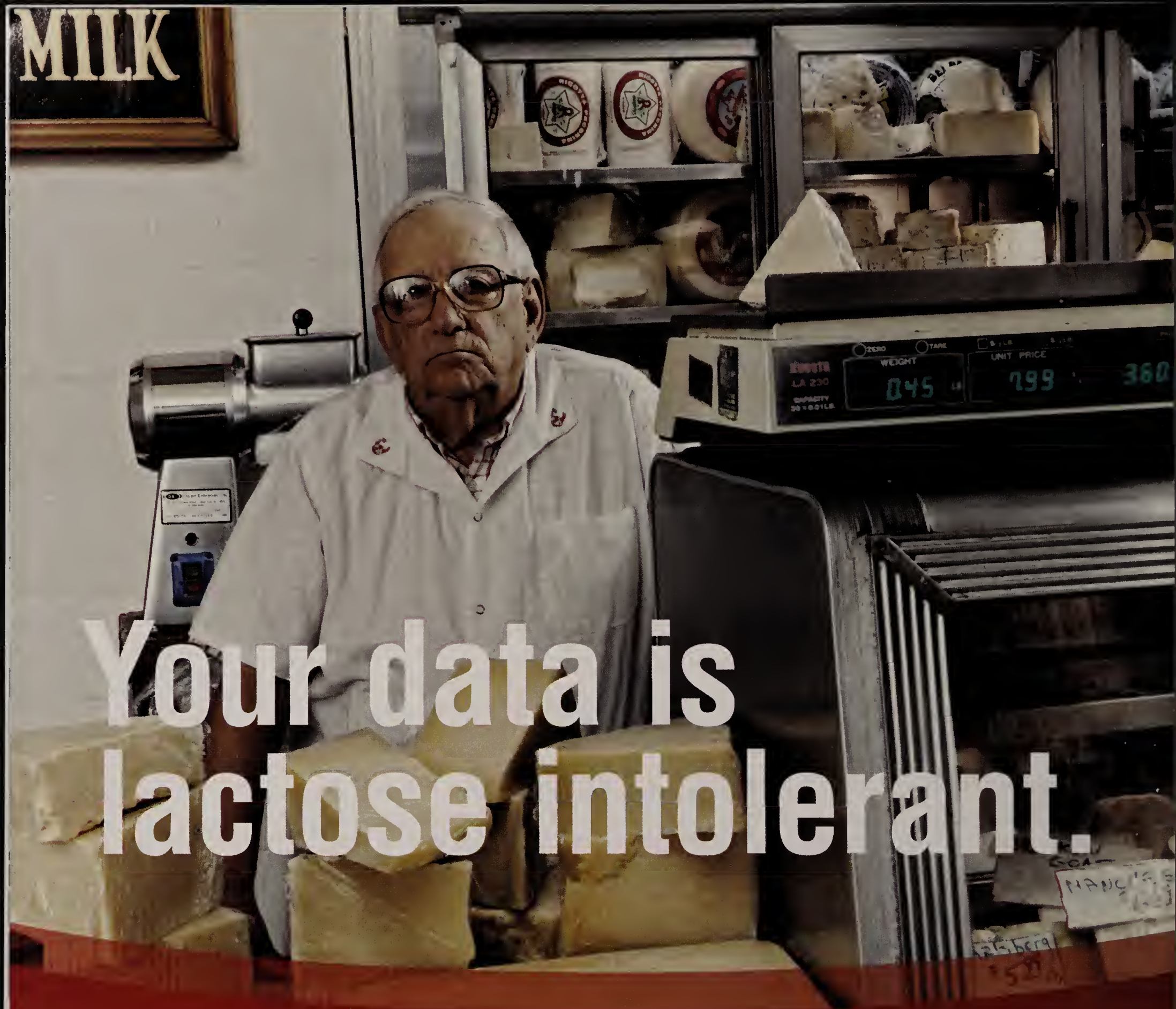
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"I started by hiring a chief architect—a sheriff with the big badge and the big chair and all the PowerPoint decks that money could buy. It proved to be untenable."

—BILL GODFREY, CIO, Dow Jones, on his initial attempt to institute enterprise architecture rules

Business Ethics

ASK THE ETHICIST | 58

As keepers of the systems that ensure compliance, CIOs increasingly face moral challenges. Ethical expert Larry Ponemon answers real-life questions on how to resolve these dilemmas.

Feature by Meridith Levinson

WHAT SHOULD YOU DO? | CIO.COM

Larry Ponemon is on hand until March 15 to answer any thorny questions you might have. Go to Ask the Source.

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SHARE POWER TO GAIN CONTROL | 28

Why CIOs should cede the *what* of IT to business executives and focus instead on the *how*.

Column by Susan Cramm

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Special Report: Enterprise Architecture

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Enterprise architecture is not just about mapping and standardizing hardware and software anymore. Now it's about services, events and—get this—good old ROI.

Feature by Christopher Koch

WANTED: ENTERPRISE ARCHITECTS | 46

IT has grown so big that the CIO can't handle it all. In order to ensure that IT is always aligned with the business, you need an enterprise architect.

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This new site is devoted to the five leadership imperatives for IT execs this year. Go to agenda.cio.com.

Health Care

SHARING DATA, SAVING LIVES | 64

Sharing medical data among doctors and hospitals in a particular region can save lives and money. But conflicting standards, financial support and privacy concerns are major hurdles.

Feature by Susannah Patton

NO PATIENT LEFT BEHIND | 24

Government and private insurers can play a key role in encouraging physicians and hospitals to invest in IT and save lives. But they've got to put some money on the table. **Column by Dr. David Blumenthal**

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As open-source development options proliferate, CIOs are finding ways to make it work for their organizations. **Feature by Christopher Lindquist**

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Sure, you're a successful CIO. But that's part of the problem.

Column by Megan Santosus

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It's the "art" of security that's the harder part—the art of diplomacy, of persuasion, of getting into and understanding other mindsets. It's everything from establishing security procedures everyone will actually follow to fostering positive relations with senior executives and the board of directors. It's getting the staff to think like a hacker or terrorist to get ahead of potential threats.

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We'll examine this complex balancing act by looking at what the top practitioners are thinking and doing, and by listening to what leading security and privacy experts think will affect the landscape of the future.

Governance and Convergence: Getting It Right

The convergence of physical and information security, if effectively governed within an organization, assigns accountability for security strategy and business plan creation at the highest levels. It can enable company leadership to identify, prioritize and balance security issues and needs of the business through a more comprehensive approach.

Enterprise Risk Management: A Matter of Focus

Looking at and balancing risk on an enterprise level is the only effective way to manage a corporation in our very complex world. Explore how enterprise risk management can give a single view of all types of risks, and an executive-level management strategy to deal with them.

Security as a Business Enabler

Perhaps the hardest part of security is to cost justify it and show its value to the business. It's like buying an insurance policy—no one really wants to spend the money. What if you could prove that security really can add value?

What's Privacy Got to Do With It?

The importance of balancing privacy and security in a digital age is only overshadowed by the perceived difficulty of actually doing it. The current economic, legal, and regulatory challenges after 9/11 have made it all the more important to ensure the adoption of good laws and technologies that protect privacy and security at the same time. We provide a roadmap.

The Cost of Compliance vs. the Cost of Non-Compliance

Some pundits say security on the way to becoming a fully-regulated industry, what with an increasing number of official directives from legislative bodies, regulatory agencies and industry consortia around the world. Toss in partially overlapping or completely diverse requirements from different agencies and you're guaranteed

that compliance will be that much more difficult—and very, very expensive. In this session, we look at the potential costs of compliance, weighed against the risks of non-compliance. What can CSOs do to understand the “dollars and sense” of it all, and to prioritize your organization's compliance list?

Fear Factor: Information Sharing

In spite of the number and variety of existing mechanisms designed to enable real information sharing among both public and private sector organizations, many folks in the security business say they just don't work. The reason: no one's really willing (or able, if corporate legal counsel has their say) to share. Yet, if no one admits to vulnerabilities, everybody suffers. Is there a way to overcome the fear factor here and make information sharing viable?

Strategic Planning: Developing the Plan That Works for You

Developing a sound strategic security plan will provide you with the means to gain management concurrence, stakeholder buy-in, and team member direction. How do you strategically approach security? Do you view it as a return on investment, from a risk management perspective, or by just playing upon emotions? This session shows how one organization developed its security strategy from beginning to end—and the measurements used to determine its success. Knowing the “how” in delivering security is just as important as the “what” you are providing to your organization.

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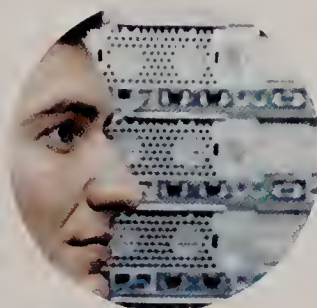
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Key to Change Management

The communication of change management is key, as Tom Scott, CIO of Lillian Vernon, shows ("Time to Change," Dec. 1, 2004). Whether a major change is initiated from the top or from those in the trenches, I like to ensure that key stakeholders are aware of the change, are told how it might affect their projects and are allowed to voice any concerns.

I do this in two forums: regular or ad hoc steering committee meetings for the executive business owners, and a weekly change control call where representatives from each department are given an advanced agenda and invited to participate.

TIM DAVIS
IT Consultant
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If you ask and answer the following questions, you will have taken a giant step toward managing change while killing the requirements bird with the same stone:

1. What are we trying to accomplish?
2. What will success look like?
3. What will it take to create that success?

Repeat this often, and a lot of problems will vanish before they are born.

R.L. TATE
IT Consultant
tater@patriot.net

Trendy Outsourcing

Outsourcing is just another trendy thing to do ("One Outsources, the Other Doesn't," Nov. 1), and the companies that are not doing it are perceived by the public as being conservative, unable to adopt modern ways of doing business and therefore business-inefficient in the long term.

All the arguments come down to two things—economy of scale and economy of scope. But this means that companies that have sufficient scale and scope of IT services inside cannot benefit from outsourcing by definition. And this is applicable not only to IT but to any other activities as well. This is just a question of proper management of IT activities, which is nothing special compared with the management of any other activities. If a company believes somebody else will manage such activities more efficiently, this means only that this company acknowledges its own weaknesses in general business management.

ANONYMOUS
IT Director

Sage advice by Geoff Smith ("You Can't Outsource Everything," Nov. 1).

CIOs also need to retain the many managerial decision-support areas where the customers are the organization's decision makers (who do not cherish calling Bangalore for on-the-spot support). CIOs also need to consider the systems analysis field itself where analysts meet with internal clients/users whose needs cannot be addressed by standard questionnaires and interviews, and where cultural sensitivity on the part of the analyst is needed. Management of the unique IT project itself requires an in-house professional

whose background goes beyond efficiency and is able to mitigate demands of budgets, personalities and effectiveness yet can still deliver on time, be an on-the-spot problem-solver and meet requirements.

While demand for IT courses is down, many university faculties bulked up on technology expertise over the past 10 years. Having neglected the business aspect in the IT curriculum in the '90s, there will be a delay while we catch up.

LASZLO POOK
Professor of MIS, MSCD
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This enrollment breakdown will become a big problem in years to come. I am working for an onsite assignment in South India. While the local employees are good at some IT work, the fundamental differences between Western and Indian schooling and general educational systems result in different kinds of IT workers. You cannot substitute European (or American) IT workers with Indian IT workers one-to-one.

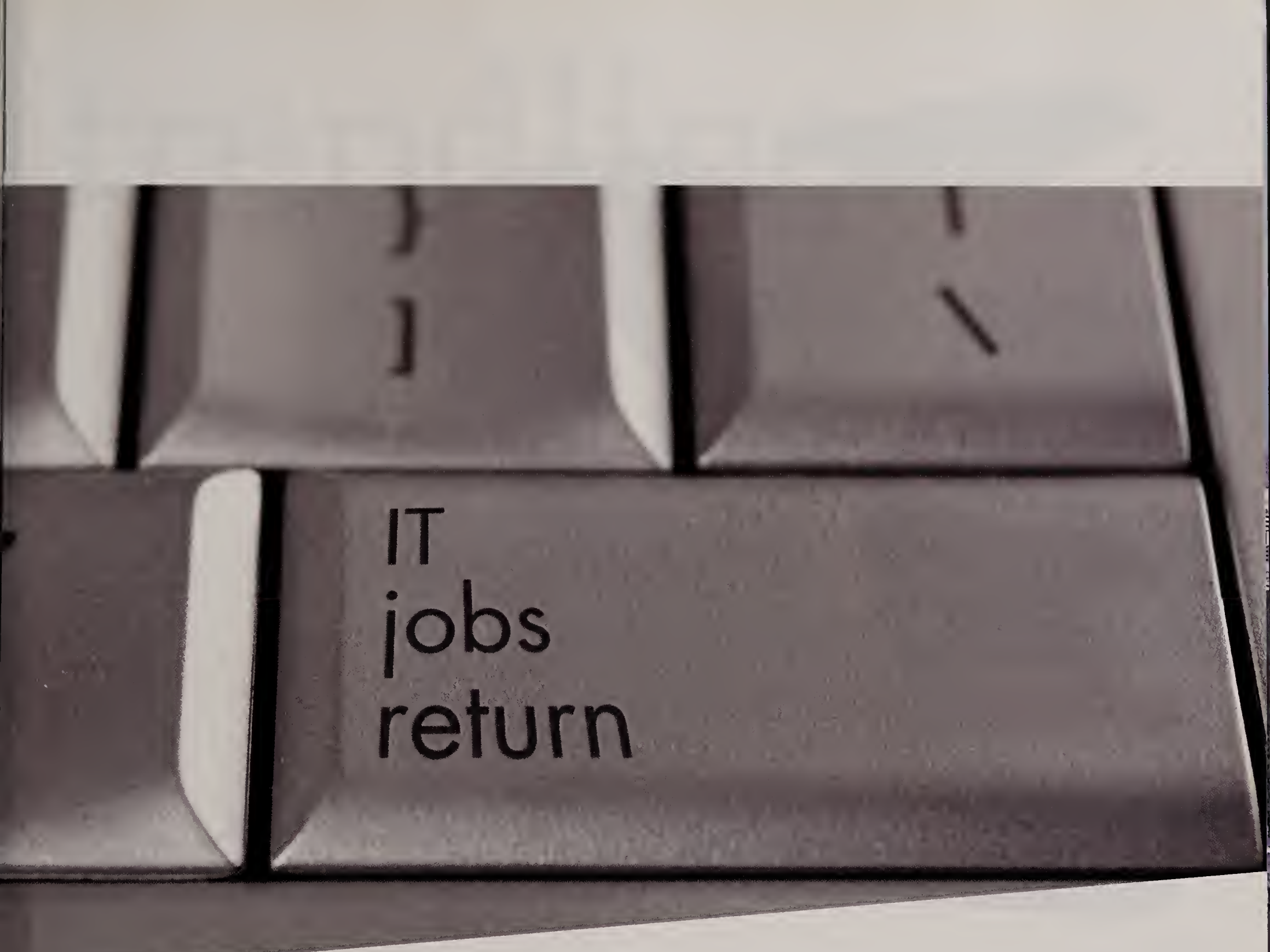
There will always be parts of the company IT that can be better handled by specialists outside the company, but outsourcing—or offshoring—should never be used as an excuse not to promote talent and training in active science fields.

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NEW * HOT * UNEXPECTED

The Jury Is Still Out

WIRELESS COURTROOMS It was to be a model for U.S. courtrooms: The 9th Judicial Circuit Court in Florida planned last spring to deploy a wireless network in its courtrooms and other facilities to transmit evidence [in trials] to courtroom screens and to enable remote video arraignment of prisoners. The use of wireless would reduce implementation costs and allow greater flexibility in the courtrooms than is provided by physically wiring the displays and computers to the central evidence server. And it would speed arraignments by keeping suspects in jail and judges in their courtrooms—estimated to save \$250,000 per year in transportation, security and housing costs.

Unfortunately, wireless technology isn't yet reliable, at least based on the experience

of Florida's 9th Judicial Circuit.

The American judicial system seems like a perfect fit for wireless. The modern courtroom is a hub of information technology: Multiple monitors display evidence and testimony to jurors and judge, while lawyers use notebooks to control their presentations. The main courthouse also has multiple LCD panels to display evidence and testimony. Court proceedings can also be digitally recorded, with voice files transmitted to

remote stenographers and available for immediate playback in courtrooms.

Yet most courtrooms are made of thick stone and expensive wood, making cabling

Continued on Page 16



The High-Tech Courtroom | In an experimental trial in 2003, technology facilitated concurrent proceedings among legal personnel from the United Kingdom, Australia and Virginia.

RFID Tagging for Hospital Patients

TRACKING TECHNOLOGY

At New York's Jacobi Medical Center, more than 200 patients admitted last summer were tagged with radio frequency identification (RFID) chips around their wrists (see band below) instead of the standard-issue plastic wristbands. The tagging was part of a pilot project at the

hospital using technology from Siemens Business Services, in an effort to streamline administrative tasks and improve the accuracy of handling patients' treatment and records.

The hospital tried the technology in two of its units—surgical and oncology, which are Wi-Fi enabled. The tags themselves contain only the patient's name, gender, date of birth and medical record number. Doctors and nurses use tablet PCs with an RFID reader that

picks up the patient's number at very close range and—when provided with proper access credentials—links to a central clinical network where the patient's medical record resides, along with information from labs, pharmacy and billing. There are plans to expand the pilot to two additional care units and then into a “general production” environment in the spring.

Do patients get to choose whether they are tagged? No. “They have to be identified,

right?” says Jerry Moy, senior client executive with Siemens Business Services. The privacy of personal data and security of stored information is probably no worse than the previous system—in which health-care providers pushed a cart loaded with three-ring binders, one for each patient, from bed to bed.

And patients may feel some added security knowing they are far less likely now to undergo a bypass when they only came in for a biopsy.

—Sandy Kendall



OPTIMISM FOR I.T. SPENDING IN THE FACE OF TIGHT BUDGETS

MANAGEMENT REPORTS CIOs are a conservative lot by nature, a tendency that rings particularly true when it comes to making spending projections in an uncertain economy. Yet the responses of CIOs in a recent survey from Merrill Lynch indicate signs of cautious optimism for IT spending in 2005—even as they anticipate slowed IT spending for the year.

In early December, Merrill Lynch polled 50 U.S.-based CIOs primarily from Fortune 1000 organizations for its quarterly "CIO User Survey." At that time, respondents said they expected their IT budgets to increase **3.9%** in 2005, down from the **6.3%** spending pace registered in 2004. But the survey respondents were rosier in their spending outlook; only **22%** said they did not anticipate a spending upturn in the near future. In the same survey conducted in the previous quarter, more than double the percentage of CIOs—**46%**—did not anticipate a spending upturn in the near future.

The Merrill Lynch analysts who conducted the report are also optimistic about IT spending in 2005, forecasting that the spending increase will be in the neighborhood of **5%** later in the year. The reason: They've observed from past surveys that CIOs wary about their IT budgets tend to loosen the purse strings as the year unfolds.

Regardless of the final amount, the CIOs surveyed said the largest portion of the pie (**43%**) would go to internal IT staff, followed by outlays for hardware (**18%**), software (**13%**), networking (**12%**), consulting and systems integration (**8%**), and outsourcing (**5%**).

Even for outsourcing vendors who may cringe at that paltry allotment, there's reason for optimism: Forty percent of CIO respondents said they expect to increase their use of outsourcing.

—Megan Santosus

The Jury Is Still Out

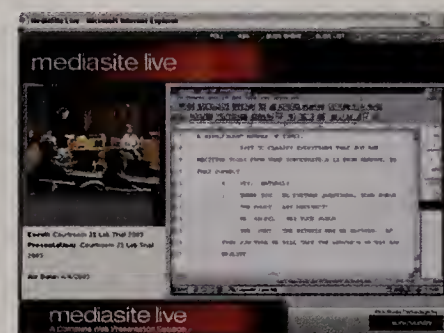
Continued from Page 15

a costly venture. Small-scale pilot deployments in Florida's 9th Circuit, which covers Orange and Osceola counties, showed no problems, so the court went ahead with its wireless implementation over the summer. But soon it became apparent that what worked in pilots did not work on a larger scale, at least not consistently. The wireless network did work in a small, satellite courthouse and in the main courthouse when only a couple of courtrooms were wirelessly enabled. But as John Byram, the court's chief audiovisual engineer, expanded the network to cover the whole courthouse, communication became inconsistent, with heavy interference at times.

The problem? Radio interference with the 802.11b wireless network, which relies on unregulated spectrum used by all sorts of devices, such as garage-door openers and cordless phones. Even the radio "noise" from some lighting systems was interfering. The specific cause of the interference remains unknown, notes Byram, though he suspects it's the radio system used by sheriff deputies.

In the meantime, Byram turned to fiber-optic lines to wire the courthouses and enable remote arraignments. To get around the physical installation issues, he routed the cables in existing electrical conduits.

While that may limit mobility within the courtroom, the wired system does accomplish the court's goals, he notes.



A webcast of a real-time trial, courtesy of **The Courtroom 21 Project**

Wireless networks to support computer-based evidence and video arraignment was one of several technologies demonstrated to court systems by The Courtroom 21 Project, an organization based at the William & Mary Law School. The small-scale demonstration deployment in a single courtroom didn't show the interference problems that the 9th Circuit experienced, notes Mollie Nichols, the project's associate director of research and professional education. But some earlier demonstrations with older technology did show interference, she adds.

The 9th Circuit's vendor, Avocent, and Courtroom 21 are now working with Byram to identify the cause of interference, to see whether the problem is a local issue or a broader one that would scuttle the concept of a wireless courtroom.

—Galen Gruman

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Traceable food may be the next wave of code-based product information, according to Dara O'Rourke, professor of environmental and labor policy at the University of California at Berkeley. "The fastest growing

sector of the American food market is organics and whole food," says O'Rourke. In such a market, health-conscious consumers want to know that the food they are eating is safe and free from harmful chemicals. Other countries have already leaped onto the idea of traceable food product labels. In Japan, laws that govern pesticide levels and other residues are stricter than in the United States; consumers in Japan can use their camera cell phones to scan a code on the outside of shrink-wrapped fruits and vegetables that's embedded with information about the produce. In Europe, a law went into effect in January to address food safety concerns spurred by mad cow disease and other recent food disasters. The law mandates traceability for food and feed.

Traceable product information is not limited to food. O'Rourke wrote a 1997 report that exposed sweatshop conditions in Nike factories in Vietnam, a report that lent credence to the movement among many



Background Checks | At Heritage Foods, a certificate lets consumers trace their turkeys' origins.

groups to provide consumers with information about how products are manufactured.

Just when will this movement take off?

That's up to consumers. "Data disclosure is really based on how much the public demands it," O'Rourke says, adding that technology to track supply chain information exists. "But in every sector I look at, the demand is growing—people want to know."

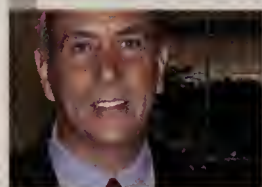
—Diann Daniel



Robert J. Webb,
CTO at Equifax



Tim Gannaway,
CIO at RSM EquiCo



Karl D. Salnoske,
VP and CIO at
Schering-Plough

The Many IT Careers that GE Built

ON THE MOVE In a recent profile of Bruce Carver, Dana Corp.'s global CIO who joined the automotive supplier after a stint at PepsiCo, *CIO* noted that there are a handful of companies, such as PepsiCo, that are known as CIO incubators because they breed CIOs like thoroughbreds (see "PepsiCo Launches Another CIO's Career" at www.cio.com/printlinks). This is not to say that the world's greatest CIOs come only from large, multinational companies, but because of their size and complexity, companies such as PepsiCo and General Electric produce a disproportionate number of CIOs. Several former GE employees recently took new IT jobs. Among them:

Now the vice president and CIO of manufacturer Rogers Corp., **Richard Marani** began his career in GE's Aircraft Engines business.

Before joining Equifax as its CTO, **Robert J. Webb** was managing director of Canadian vendor financing at GE and previously held the CIO post for several GE divisions, including GE Capital's Mid-Market Finance group, the Global Consumer Finance group in Japan and GE Power Systems.

Raj Datt served as global director of GE Energy's ERP Center of Excellence and CIO of GE Energy Rentals before joining Panasonic Automotive Systems as its CIO and executive director.

In other career moves, **Don Vietti**

took over as vice president and CIO of electronics retailer RadioShack. Vietti succeeds **Evelyn Follit**, who retired from the company on Feb. 28. Follit joined the company in 1997 as vice president of human capital and was named CIO within a year.

Tim Gannaway was promoted to CIO at RSM EquiCo, a global investment banking firm. One of Gannaway's first orders of business as CIO was promoting Hector Franco from director of IT services to vice president of IT services.

Without a CIO for nine months, Schering-Plough hired **Karl D. Salnoske** as its new vice president and CIO. He replaces Donald Lemma, who left the company in early 2004 after a two-year stint, and reports to Robert Bertolini, the pharmaceutical company's executive vice president and CFO. Salnoske was CEO of a software startup before joining Schering-Plough. —Meridith Levinson

Fr: a wide range of information management challenges

To: a wide range of software to overcome them



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Number of Patents

1	IBM	3,277	1
2	Hewlett-Packard	1,780	4
3	Micron Technology	1,761	5
4	Intel	1,604	7
5	General Electric	978	14
6	Texas Instruments	915	16
7	Advanced Micro Devices	803	20
8	Eastman Kodak	714	25
9	Sun Microsystems	679	27
10	Agilent Technologies	651	28
11	Microsoft	629	29
12	Motorola	567	30
13	Delphi Technologies	552	31
14	Lucent Technologies	546	33
15	Honeywell	536	34

SOURCE: IFI Claims Patent Services

That Headache May Come From Your Screen

ERGONOMICS Headaches. Tired eyes. Neck and shoulder pain. Sure, you've been logging lots of time at the office lately, and you figure you're feeling the stresses and strains associated with all that hard work. But if you spend hours each day staring at a computer screen, you might wind up suffering from computer vision syndrome (CVS).

The above symptoms "result from how our eyes focus—or more accurately don't focus—on a computer screen," says Jon Torrey, an entrepreneur. In the '80s, Torrey was doing some product development work with engineers who were heavy computer users; they often complained about eyestrain and headaches. Their gripes got Torrey thinking about what happens when people spend hours each day looking at computer screens. He applied his curiosity to research by teaming up with an optometrist to create a diagnostic tool that simulates how eyes focus on a computer screen. Today, Torrey is president and CEO of Prio, a small company that he founded to develop and market tools to diagnose CVS.

As Torrey explains, the lens in the human cornea focuses on objects by changing shape, a process that is essentially made easier when objects have distinct, defined edges. On computer screens, the pixels used to create images, whether it's text, photos or graphics, have fuzzy, ill-defined edges. Therefore, says Torrey, computer users are constantly yet imperceptibly focusing and refocusing their eyes; such ongoing efforts cause eyestrain and ultimately CVS. The discomforts of CVS, says Torrey, invariably end up taking a toll on employee productivity.

To solve the problem of CVS, computer users often need corrective lenses specifically prescribed for computer viewing, and that's where Torrey sees a promising business opportunity. In 1993, Prio launched its first CVS testing device and began selling it to optometrists. The test takes about three minutes to administer and usually costs an extra \$10. To date, says Torrey, Prio has sold its tool to 10 percent of the optometry market. Also Prio recently joined other lens manufacturers by jumping into the market of selling frames and lenses just for computer users. *—Megan Santosus*

Prio's diagnostic test for computer vision syndrome



Fr: no good idea unsaid

To: no good idea unshared

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THE GROWING RANKS OF THE UNTETHERED

WIRELESS From 2003 to 2004, the market for cellular modems grew 167 percent. By 2009, more than 14 million cellular modems will ship worldwide, up from 2.5 million last year.

SOURCE: In-Stat/MDR.



TRENDLINES

Bringing IT to Rural India One Village at a Time

THE DIGITAL DIVIDE

Imagine that you live in the village of Siroha, located just 25 miles from Kanpur, the largest city in India's most populous state, Uttar Pradesh. Your son has moved to Delhi for a job with the GE call center serving American customers. If you want to speak to or e-mail him, you must ride your bicycle five miles and lose half a day's wages to find a telephone. Welcome to the digital divide.

The digital divide is a fact of life for the 700 million rural people in India who have an average annual GDP per person of less than \$500. Neither state-run nor private telecommunications efforts have found an economical way to serve these people. Until now.

Media Lab Asia, an independent organization that began as an offshoot of MIT's famed Media Lab, built a demo to sell to Siroha IP telephony and

e-mail services via a two-hop 802.11b connection from the Indian Institute of Technology (IIT) at Kanpur. Media Lab Asia has also set up a mobile Internet kiosk mounted on a bicycle; the onboard computer is equipped with an omnidirectional antenna for Internet service and is powered by a specially designed all-day battery. Ten such carts, known as "info-thelas," ply the villages around the IIT campus.

A thousand miles to the south, Professor Ashok Jhunjunwala runs the Telecommunication and Networking Group, Tenet, on another IIT campus. Tenet researchers are also addressing the digital divide via several startups.

Midas Communication Technologies developed a telecom switch that transmits using wireless local loop technology to solve the "last mile" problem of extending service to end users. Another company, n-Logue Communications, is a rural ISP that feeds off the Midas switches and enables turnkey village Internet kiosks for \$1,200 apiece. These manned kiosks provide budding entrepreneurs with about \$75 per month of income for services ranging from communications, education and remote medical diagnosis. While 2,000 villages are equipped already, India has another 600,000 villages that could use such kiosks, and similar rural markets exist in many third-world countries. Such an underserved population can translate into enormous opportunities for vendors.

—Gunjan Bagla

Have Bike, Will Compute | Media Lab Asia's mobile Internet kiosk known as an info-thela (left); a Media Lab Asia official shows off technology in Hyderabad, India.



PHOTOS BY PALLAVA BAGLA; ILLUSTRATION BY ROBIN JAREAU/GETTY IMAGES

Fr: managing your entire e-mail system

To: managing it while you check your voice mail

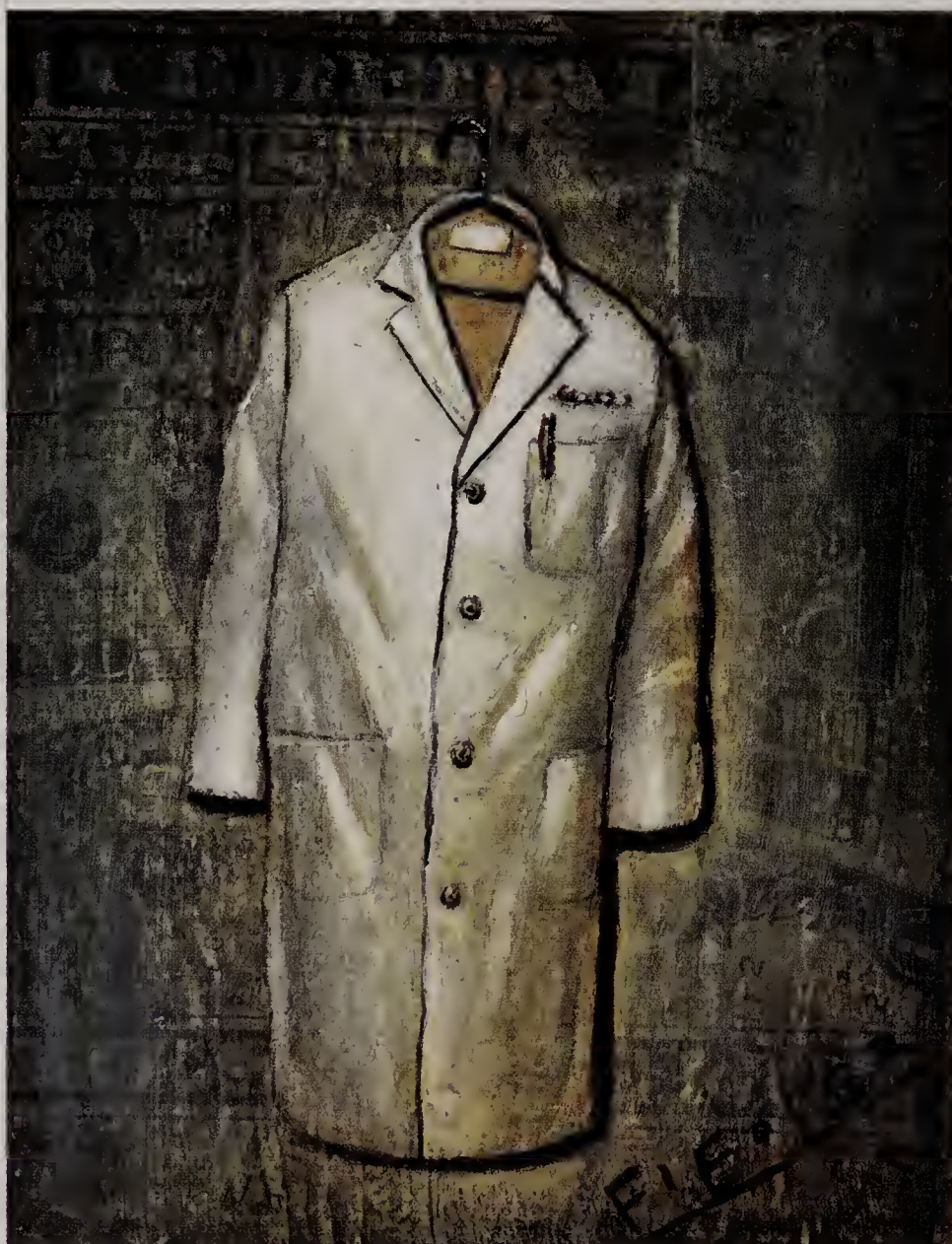


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No Patient Left Behind

Federal government and private insurers can play a key role in encouraging physicians and hospitals to invest in IT and save lives. But they've got to put some money on the table.



Medical care is all about having the right information about the right patient in the right place at the right time. Without that information, practicing medicine is not only inefficient but downright dangerous. So doctors and hospitals should be at the cutting edge of information technology, right?

Wrong. The health-care system is a well-known laggard in using IT. Most doctors don't use computers in the routine care of patients in their offices. Most hospitals do not enable physicians to enter patient drug prescriptions electronically, a practice that reduces medication errors dramatically. (See "Sharing Data, Saving Lives," Page 64.) When it comes to using information technology, the checkout clerk at your supermarket makes many doctors look like dullards.

The question, of course, is how did health care fall so far behind in the information technology movement, and what can, or should, be done about it?

The story of health care and IT starts with an enduring metaphor: the black bag. In film and literature, the doctor is the man or woman who arrives at the scene of illness or injury carrying a familiar black bag that contains all the tools necessary to cure and alleviate disease and suffering. In fact, that bag turns out to be full of dysfunctional myths that still hamstring progress in our health-care system generally and the adoption of IT in particular.

The first implication of the black bag metaphor is that the critical element in curing is the doctor. After all, the bag can't contain much, so the magic must be in the individual, in his discerning eye, keen intelligence and soothing hands. This may have been true 100 years ago (when medicine had little to offer anyway), but health care now is a \$1.6 trillion enterprise whose

An aerial photograph of a city skyline, featuring numerous skyscrapers and a large stadium with a distinctive curved roof in the foreground. The text "100+" is overlaid on the image.

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magic, if it exists, resides in magnetic resonance imagers, cardiac catheterization labs and drug formulas. In the 21st century, physicians are just part of a vast, far-flung health-care enterprise, and they often haven't a clue what happens to their patients outside their own offices.

Nevertheless, the myth that doctors are the captains of the health-care ship and that they can operate effectively alone, remains powerful in the public imagination and is deeply cherished by the profession itself, especially the roughly 50 percent of physicians who practice alone or in small, independent groups. Protected by laws that give them control over most medical decisions and payment systems that compensate them independently, physicians remain largely autonomous agents.

Increasing the monetary incentives for doctors and hospitals could enhance the business case for health-care IT.

And many don't want to use information technology in their daily practice. Older physicians—say, those over 55—are simply uncomfortable with the technology. Middle-aged and younger physicians may be more receptive, but they face some significant problems. Their income is tied to output—numbers of patients seen and procedures done. The introduction of IT is disruptive to workflow and causes short-term reductions in productivity and income. Then there is also the cost of purchase and installation of health information technology—estimated in the \$10,000 to \$30,000 range.

Physicians might make these up-front outlays, if it were not for several additional problems. The technology keeps changing, and doctors fear that they will keep having to purchase and learn to use new software and hardware. And perhaps most problematic, there is as yet no compelling business case for making the initial outlay. The benefits of health IT—in terms of costs avoided and quality and safety improvements—are likely to be substantial, and as professionals, physicians welcome them. But the avoided costs largely benefit employers, government and insurers, not physicians.

The situation is slightly more promising—but only slightly—for large health-care institutions. A few large health systems—such as the Veterans Health Administration and the Intermountain Health System based in Salt Lake City—have been pioneers in the adoption of health IT. Such organizations have access to the many millions of dollars required to install health information technology and frequently employ all or most of their physicians. Even for hospitals, however, uptake of health IT has been slow. It is estimated that only between 5 percent and 10 percent of U.S. hospitals have adopted computerized physician order entry (CPOE), despite the fact that it seems to reduce medication errors by up to 80

percent and avoids substantial costs associated with resulting complications. Why haven't hospitals done more to take advantage of IT? Three reasons dominate. First, their (mostly self-employed) physicians resist it, for the aforementioned reasons. Last year, a medical staff revolt required the Cedars Sinai Hospital in Los Angeles to suspend the rollout of a CPOE system. Second, not all hospitals have access to the required capital. Third, the business case for health IT is no better delineated for most hospitals than it is for individual physicians.

The Leadership Test

Though the sociology and economics of health care have not favored adoption of health IT, change is in the wind. President Bush has made a commitment to encouraging the use of health IT. Private groups such as the American Academy of Family Practice have been working hard to help members adopt health IT. The recently passed Medicare Modernization Act enacted several demonstration programs that will allow the Medicare program to reward physicians for adopting IT systems.

It is essential for government leaders at the federal, state and local levels to lay out goals for the adoption of IT systems in their jurisdictions, and to mobilize private-sector leaders to achieve these goals. Yet despite President Bush's public commitment to health-care IT, Congress recently declined to fund a modest \$50 million request to support his national IT initiative. The Department of Health and Human Services restored the \$50 million but took the money from other key programs.

Funding, not surprisingly, is a key element to overcoming the barriers to health-care IT. For individual physicians and smaller hospitals, the business case can be enhanced through grants and loans to purchase necessary systems. Or it could be created through increasing incentives for doctors and hospitals that use IT in patient care. For example, Medicare and private health plans could pay doctors or hospitals using approved IT systems a little extra for each patient visit or procedure or an extra bonus each year for each covered patient in the doctor's practice. A group of private employers has actually launched a program called Bridges to Excellence that is attempting to do precisely that by giving doctors with IT systems an annual bonus for each patient they care for.

Myths die hard, especially myths rooted in the ancient history of the healing arts. But no force in human affairs has proven stronger than technology. Most paper will disappear from medical practice. The question is only whether physicians alive today will enter this promised land, or whether a new generation will lead the way. **CIO**

Dr. David Blumenthal is Samuel O. Thier Professor of Medicine and Professor of Health Care Policy at Harvard Medical School and director of the Institute for Health Policy at Massachusetts General Hospital. Executive Editor Alison Bass can be reached at abass@cio.com.





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Share Power to Gain Control

Why CIOs should cede the *what* of IT to business executives and focus instead on the *how*



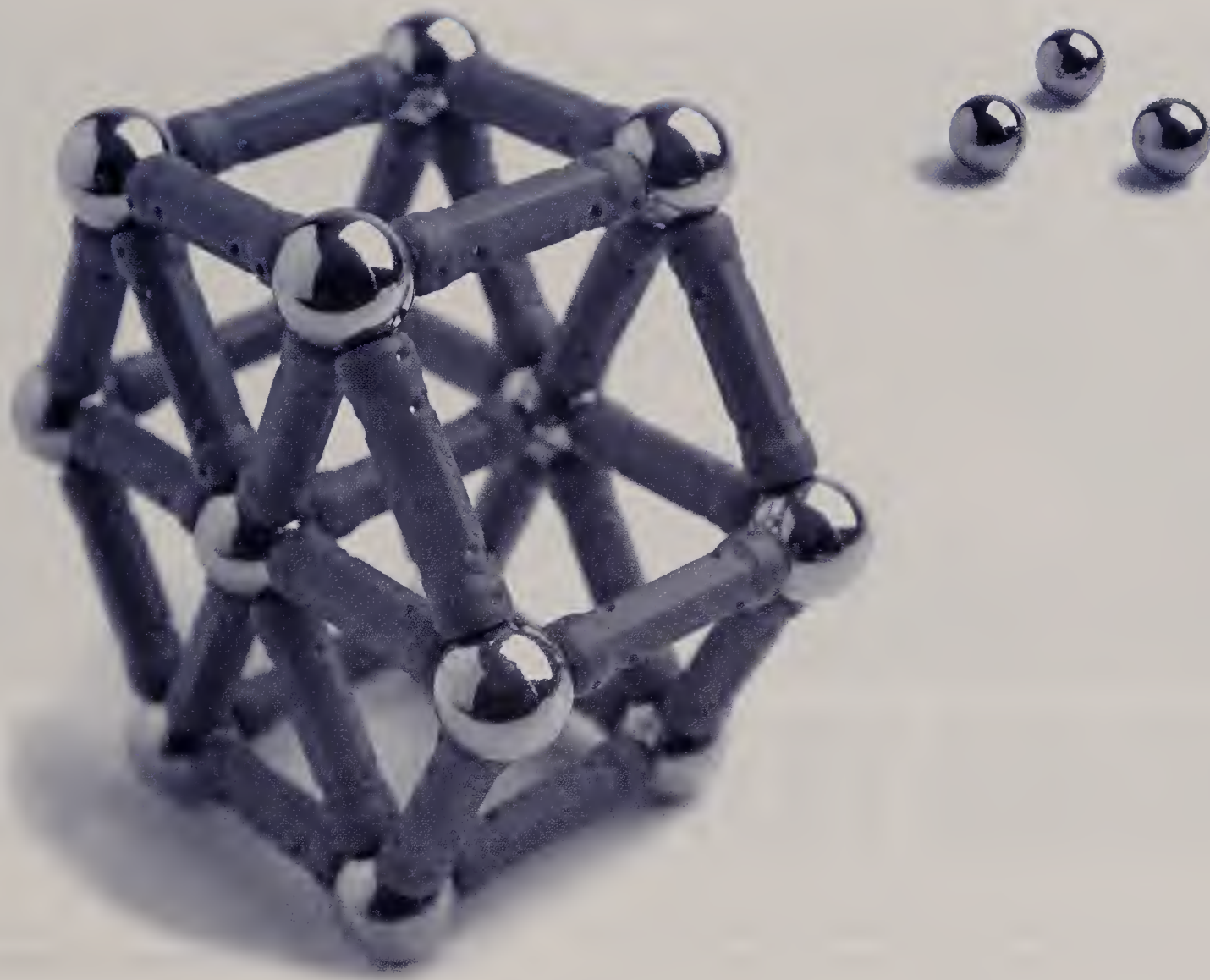
Who people work with is more important than who they work for, a Gartner EXP publication asserted recently. This statement is right on. Every time there's an IT reorganization, too much emphasis is placed on structure and the unworkable extremes of centralization versus decentralization. Instead, CIOs should let IT's organizational structure mirror that of the enterprise and focus their time on defining the decision rights—that is, who has the final say about key IT decisions—necessary for collaboration between IT and the business.

When determining IT decision rights, it's wise to remember the adage, To gain control, you have to give it away. That same adage applies to raising children ("You have two choices," parents say), and it works when you're trying to cozy up to business partners while maintaining some semblance of IT order at the enterprise level.

Too often in the past, IT—like a desperate parent—has tried vainly to get its business counterparts to "grow up" without granting the necessary freedoms. In many organizations, business executives have little authority over IT funding, priorities, sequencing and resources, and feel forced to establish shadow IT organizations and partner with vendors who have gone around the IT organization. With one hand, CIOs attempt to limit business freedoms, while with the other, they try to finagle business counterparts into accepting accountability for value commitments.

Since business accountability is out of whack with its authority, IT executives are in a constant state of frustration as they try to extract the desired behaviors from the business. CIOs find themselves operating like surrogate users and assuming business partner roles (for instance, developing strategy, selling

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I.T. DECISION RIGHTS

Play the Proper Roles to Do IT Right

	THE BUSINESS EXECUTIVE'S ROLE: THE "WHAT" OF I.T.	THE CIO'S ROLE: THE "HOW" OF I.T.
IT planning	IT business initiatives, value projections, prioritization criteria	Target architecture, infrastructure strategies, sequencing criteria, decision rights
Project priorities	Business initiatives	IT initiatives
Service priorities	Service level objectives (SLOs)	SLO resource requirements
Project implementation	Timing: stop, start, deter	Estimates and approach
Project management	(No role)	Skills, staffing, methods
Money	Budget authority for business initiatives	Budget authority for IT initiatives
Vendors/People	Selection from qualified candidates Performance evaluation over the end result	Standards and qualification Performance evaluation over the means
Technology	(No role)	Standards and guidelines
Compliance/Asset protection	Risk posture	Approach and resource requirements

initiatives, writing business cases, managing business change and reporting value realization).

You will never achieve the partnership necessary for success unless you arrange decision rights to promote accountability from the business side. If you doubt the importance of this act, ask yourself why you never hear business leaders blaming the quality of their profits on finance or their people on human resources—yet their complaints about IT systems are commonplace. CIOs need to follow the lead of mature financial and HR organizations and delegate authority for the management of certain aspects of IT to the business, in line with competence and a commitment to follow the rules (that is, policies ensuring that the enterprise doesn't suffer at the hands of individual interests).

A simple but elegant way to responsibly delegate IT authority is to grant the business the authority over the "what" of IT while retaining authority over *how* IT is delivered (a concept shared with me by Jerry Gregoire when he was leading the Dell IT organization). This means that your business customers determine the IT-enabled business strategies and plans, set priorities and service requirements, allocate funding, approve vendors and people, and define risk postures. Meanwhile, IT retains the final say over architectures, technologies, infrastructure strategies, decision rights, IT initiatives, resource requirements, methods and tools, and the required qualifications for people and vendors. The idea is to transition from a custodial model of IT—that is, doing IT on behalf of the company—to a fiduciary model, in which you ensure that the company does IT right.

The determination of decision rights should be based on the maturity of the organization, within the business as well as the IT department. Although the majority of companies are not mature in their usage or in their management of technology, "IT Decision Rights" above serves as a reference point.

There's a good reason why business partners often try to go their own way with technology. Since they run the business, they want control over the major factors of production: money, people and technology. Don't fight this impulse; the business side should have appropriate control of IT. Delegating authority over the "what" of IT to the lowest level practical provides the means for IT to expand its organizational impact. Once that happens, you can transition from being viewed as a roadblock to an enabler.

Reader Q&A

Q: Our government is undertaking a massive centralization, moving virtually all IT staff and management from 20 departments to a centralized, shared-services IT organization. Many of us believe that the individual departments, which conduct the business of government, should retain at least some IT roles and functions to facilitate strategic planning, to steward the business's IT vision and to ensure that the new, centralized IT organization delivers the maximum value for the funding it receives. Based on the table in the article, what roles should a lean and mean department-based IT group hold?

A: You are right on target in your thinking. Assuming that the reorganization will result in few departmental IT resources, your role will become primarily one of planning, coordination and communication. As such, do the best you can to retain as many of the decision rights in the "business executive role" column. It's a matter of negotiation. **CIO**

Susan Cramm is founder and president of Valuedance, an executive coaching firm in San Clemente, Calif. You can e-mail feedback to susan@valuedance.com.



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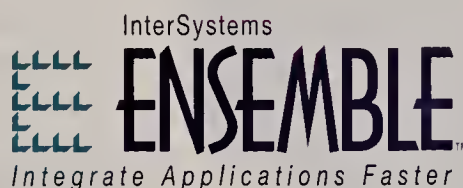
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Why You're Not Happy

Sure, you're a successful CIO. But that's part of the problem. **BY MEGAN SANTOSUS**



The new year is barely two months old, but I'm going to go out on a limb and guess that you've already abandoned your resolutions to dive the Great Barrier Reef, start going to the gym three days a week, attend all of your kid's basketball games, learn to cook crème brûlée or do anything else that would give your life some semblance of balance. I know all this because you're a CIO, a position that, by definition, implies dedication of an almost monomaniacal sort, with late nights and significant personal sacrifices. Add to that today's rather perilous business conditions, as evidenced by the reduced headcount in your IT group and that nooselike budget, and you've got a lot to do—with fewer people and fewer resources. So who has the time to even think about balance?

Apparently, not too many CIOs. In our recent year-end issue that examined what it's like to be a CIO, we ran a collection of first-person stories that delved into some of the more unusual, interesting and offbeat aspects of CIO existence. One of the "off-beat" pieces was written by Bob Weir, CIO at Northeastern University. What made Weir's experience so novel as to merit inclusion in the issue was the fact that he takes "real" vacations. Every year. What makes them "real," according to Weir, is the fact that he leaves his second-in-command in charge, and his staff never calls him while he's away.

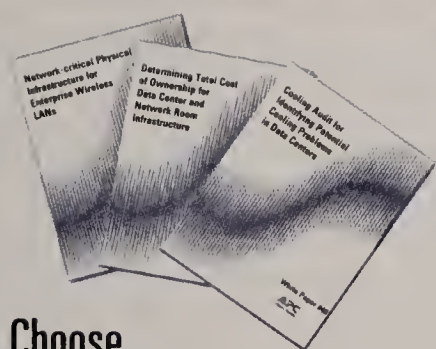
He was 21 years into his career before he managed this. He describes the experience as transforming.

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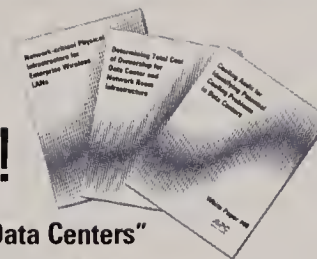


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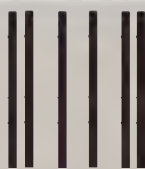
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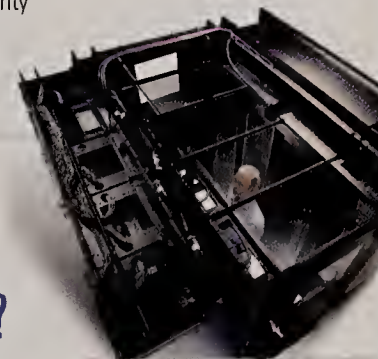
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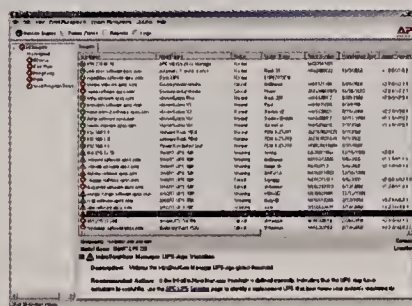
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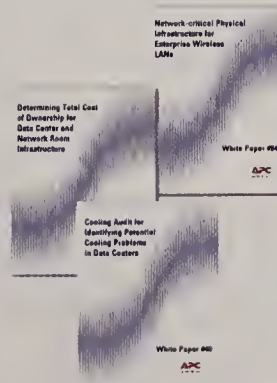
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walls. Yet within weeks, these well-intended plans invariably fall by the wayside. It's not difficult to see why. Being a CIO, even when times are hard, can be pretty exciting, pretty absorbing. IT is a main driver of productivity, innovation and service, and the CIO, as the head IT honcho, is at the center of the action. Then, there are those alluring trappings of executive success: the nice office, the comfortable six-figure salary, the year-end bonus or stock options (if you're lucky) and maybe a trip, once or twice each year, to an industry conference in an exotic locale. On the company tab, no less.

Conventional wisdom holds that all those things that make your professional life shine require a certain amount of polishing at the expense of a personal life. But what if the wisdom is wrong? What if a definition of success that encompasses nothing more than your job turns your life into a puzzle with key pieces forever and frustratingly missing?

Coauthors Laura Nash and Howard Stevenson of the Harvard Business School are out to shake up conventional notions of success with their recent book titled (somewhat misleadingly) *Just Enough*. (A better title would be *The Many Faces of Success*.) The book's premise is that too many businesspeople put all their notions of success into one professional basket. By doing so, they put themselves on an endlessly revolving gerbil wheel, trying to achieve a continuously receding and ultimately unattainable more: more titles, more money, more deals. And no matter how much more they achieve and acquire, there's always more waiting to be achieved or acquired in (they think) just another turn of the wheel.

So they keep running.

Success Ain't No Lady

Why this endless chase? Because the bar of success has been set unrealistically high and has been made neurotically narrow. We can blame the dotcom boom that celebrated all those go-getters who achieved enormous, otherworldly riches in the blink of an eye. We can also blame a celebrity-fixated culture that elevated CEOs such as Jack Welch to demigod status. Such folks are hugely influential. The financial prizes they've won are cataloged and publicized and oohed-and-aahed over. They're held up as the model of who every red-blooded American businessman or businesswoman should try to be.

Just Enough argues that this kind of success is one-dimensional and ultimately hollow. As the authors ably point out, being successful is about more than just financial rewards or reaching ever higher rungs on the corporate ladder. Success, they assert, comes in four categories, none of which is more important than another. There's happiness, which derives from being content with one's life; there's

Why do we keep running? Because the bar of success has been set unrealistically high and neurotically narrow.

achievement, which comes from setting and reaching admirable goals; there's significance, which involves doing things that positively affect friends, colleagues and family; and there's legacy, in which one's values and achievements are put to good use to help others succeed in the future.

Clearly, doing well professionally falls squarely into the achievement category, and could even spill over into other categories. But the authors emphasize throughout the book that success is multidimensional. It can't all be about work and money. Competing solely in those arenas robs one of the energy and attention needed to create ties to family, to master a new hobby or even, in the case of too many CIOs, to be happy.

Or take a well-deserved vacation.

Balance Requires Juggling

There are a lot of books about balance. *Just Enough* is different because it acknowledges how difficult it is to achieve. Balance is not about casting aside activities in one category to devote your undivided attention to something in another category. It's about constantly moving between categories, juggling them, making a series of decisions throughout your lifetime. What demands my attention now? And if I put my attention *here*, when and how will I make it up over *there*? And it's not about giving up one thing to focus on another. Leaving the workforce early to raise kids (attending to the category of significance) or hitchhike around the world (if that makes you happy) won't complete your puzzle and provide balance unless these activities also address achievement and leave a legacy you can be proud of.

Nash and Stevenson spent a lot of time interviewing business leaders who have passed through the Harvard Business School. By and large, these people have achieved a significant measure of what most would call success. Yet, the authors report that in the course of conducting these interviews, they often identified a note of wistful yearning. These people were unsatisfied. Could it be that our concept of success needs a radical overhaul?

Nash and Stevenson say it does. Yet, despite the worksheets and questionnaires they provide in an attempt to get their readers to take a fresh look at how they define, visualize and pursue success, I get the sense that the authors are fighting an uphill battle that, year in and year out, will bog down our friends and colleagues under the weight of work, some never again to be seen. **CIO**

Senior Editor Megan Santosus can be reached at santosus@cio.com.



PHOTO BY LESLIE FEAGLEY

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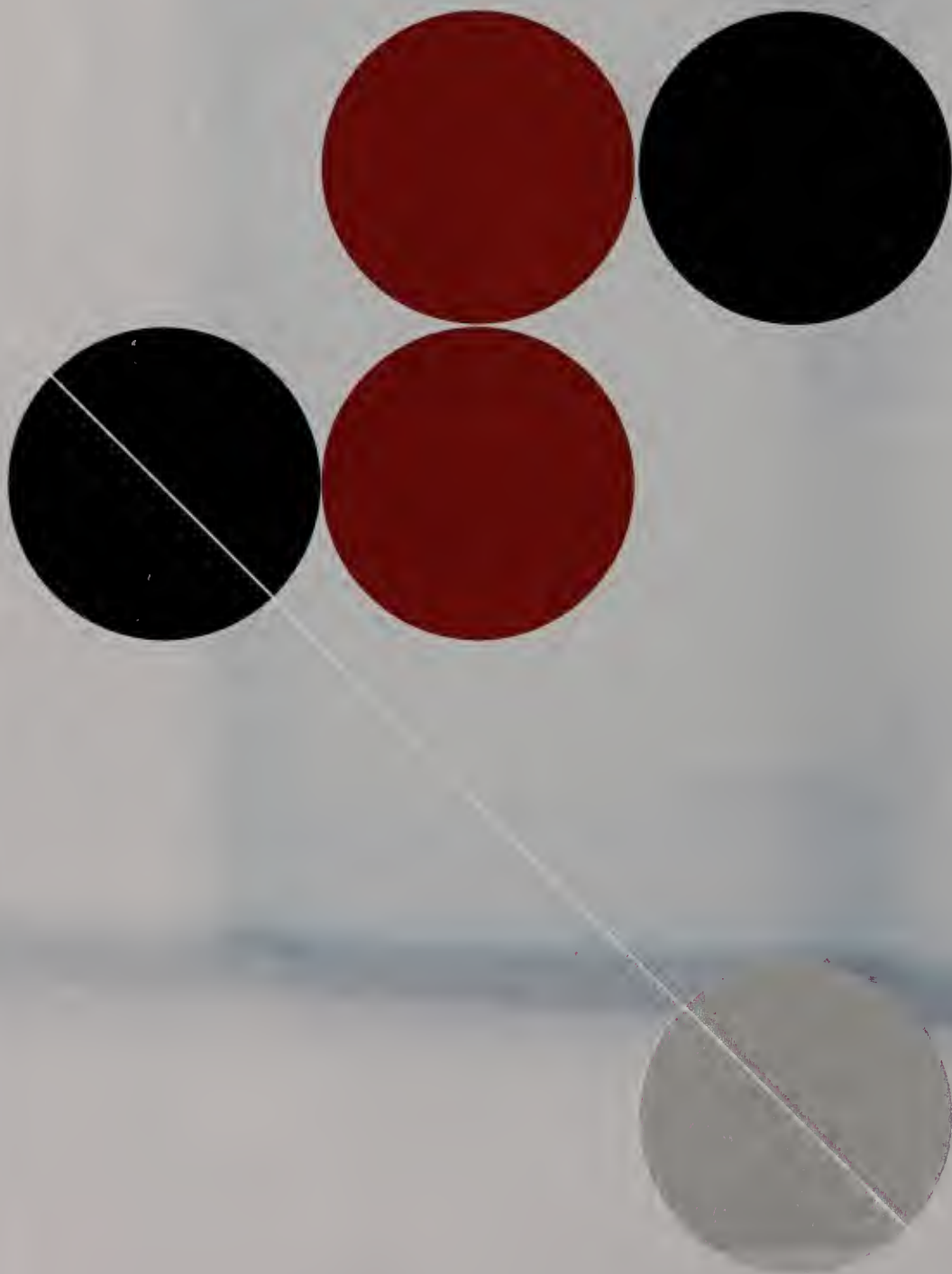
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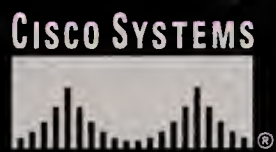
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Enterprise architecture is not just about mapping and standardizing hardware



Dow Jones CIO BILL GODFREY notes that "it doesn't always make sense to force everybody onto one system."

A NEW BLUEPRINT and software anymore. Now it's about services, events and—get this—good old ROI. FOR THE ENTERPRISE

B Y C H R I S T O P H E R K O C H

Bill Godfrey, CIO of Dow Jones, remembers how his first enterprise architect rode into town in 1999—confident, aggressive; one could almost hear his spurs jingle-jangle. “I started by hiring a chief architect—a sheriff with the big badge and the big chair and all the PowerPoint decks that money could buy,” Godfrey recalls. “It proved to be untenable.”

EA “Version 1,” as Godfrey now calls it, didn’t accomplish his goal of creating a unified IT architecture (standardized hardware and software systems) across all of Dow Jones’s business units, with tighter links to the business and its strategy. It didn’t work, Godfrey says, because he invested too much power in one person who had too much to do. When the architect/sheriff looked for cooperation from the different business units, he got static. They saw him as a cop who prevented them from using the technologies they thought they needed.

“It didn’t get into the information flows of the business enough and was seen as an ivory tower project,” says Godfrey.

So he adjusted. He abolished the chief architect job and, in 2001, designed a federated structure of architects from the different business units, working together to share best practices and coordinate architecture decisions across the company. Godfrey still wanted the same things, but he replaced the big badge and PowerPoint slides with cooperation and brown bag lunches.

That didn’t work either.

The architects were co-opted by the business guys who demanded this, that and the next app for their lines of business. “The architects couldn’t create enough time to work

Reader ROI

- ⌘ How the new EA is different from—and better than—the old
- ⌘ The four elements of all enterprise architectures
- ⌘ How service-oriented architecture facilitates EA

on enterprise architecture," Godfrey recalls.

Last June, Godfrey, a determined man, launched Enterprise Architecture Version 3.0, which combines elements of both approaches. He created what he calls the Architecture Zoning Board, run by a vice president of IT who reports directly to Godfrey, and three architects and seven senior technologists who manage the still-developing architecture. (For more on managing an enterprise architecture, see "EA Needs Governance," Page 44.)

Godfrey has invested the group with a lot of authority. Anyone at Dow Jones who wants to spend more than \$250,000 on a project must get approval from the architecture group. To get the money, project leaders have to submit to a review process in which Godfrey's architects decide whether the project's goals and technology fit into Dow Jones's overall business and technology strategy. Some businesspeople—and even a few IT people—grumble that Godfrey has replaced the cop with an entire precinct, but at least the rules and the goals (reduce costs, increase standardization, speed development) are clearer now. Godfrey says it's too early to tell whether the third time is the charm, but he's hopeful: "I believe we finally have the right balance and that 2005 will be the year we get EA to bite into capital planning, project processes and culture."

In a time when enterprise architecture seems to be on almost every CIO's lips, Godfrey's Version 3.0 looks like many other mature enterprise architecture efforts. Most have a small central group (Forrester found that 84 percent of companies it surveyed had centralized enterprise architecture groups of fewer than 10 people, regardless of company size). The groups dangle a carrot (money) and wield a big stick (project review). Their goals are to promote alignment, standardization, reuse of existing IT assets, and the sharing of common methods for project management and software development across the company. The end result, theoretically, is that enterprise architecture will make IT cheaper, more strategic and more responsive.

And increasingly, whether by dint of desperation or by a cool assessment of what's recently become possible, CIOs—and their organizations—are buying into the theory.

EA ON THE CHEAP

You want to build an enterprise architecture but don't have the money or the manpower? Here's how one CIO took some shortcuts.

What's that, you say? Can't afford to hire six enterprise architects? Can't get your CEO to sit still for those monthly enterprise architecture committee meetings?

Doing enterprise architecture on the cheap means you have to forgo much of the planning and governance and focus instead on services and reusable integration. That may still mean investing in some developers who know Web services and buying some middleware to provide the integration glue that Web services lacks, but the CFO will be able to hold onto those old mainframes while watching IT become more responsive and quicker to deliver new capabilities from them.

Dave Mewes (pronounced May-vis), CIO of MasterBrands, a furniture manufacturer, doesn't have an EA team, a map or a committee. Instead, he has a jumble of old mainframe systems spread over 22 different plants, the result of an aggressive acquisition strategy. Mewes decided to save money by taking a services-and-middleware approach to his architecture that would leverage the mainframes he already had.

He sifted through the processes of all those plants to see if there were any chunks that could be shared. He found two: order and inventory status. Using a combination of middleware and Web services, Mewes's enterprise architect (he does have one of those) created composite applications that handle those pieces of the business process for about one-third of the factories. (He's working on the rest.) He also used the middleware and Web services to build more flexibility into the mainframe systems at those factories, which shut down twice a day for batch processing. The middleware hooks into the orders that pile up inside the systems during their downtime and gets them out to the loading docks.

"We used to send out the trucks and find a few orders that came in after the batch process started," Mewes says. "We'd have to send them out on a [nearly empty] truck the next morning at 85 bucks extra a pop. Now we can catch those orders and get them on the truck before it leaves for the night."

It ain't state-of-the-art, but it's an architecture. And it works.

—C.K.

How EA Came in from the Cold

Enterprise architecture has long been the concept that dared not speak its name. Some CIOs go to great lengths to avoid using the term with their business peers for fear of scaring, alienating or simply boring them to death. But companies (such as Dow Jones, T-Mobile and Verizon) that have stuck with it are beginning to reap the savings, flexibility and business alignment that its proponents have been promising for nearly 20 years.

The concept hasn't changed much in that time: It's still basically city planning for IT, an overarching plan of the total data, business processes and IT assets inside a company, how they're used, and how they should be built and shared.

This has always been a big, difficult and expensive undertaking, and its ROI has often been opaque to the business. Standardizing, mapping and controlling IT assets does not make the business obviously more flexible, capable or profitable. As a result, IT architecture efforts often fail or become completely IT-centric.

But now that's changing.

Advances in integration technology—primarily intelligent and flexible middleware and Web services—are providing new ways for designing more agile, more responsive enterprise architectures that provide the kind of value the business has been seeking. With these new architectures, IT can build new business capabilities faster, cheaper and in a vocabulary the business can understand.

These advances are giving new life to a

couple of old concepts that could inspire new EA efforts and revive failing ones.

The first concept is services, better known today as service-oriented architecture. SOA provides the value to the business that in the old enterprise architecture was rarely more than a vague promise.

The idea behind services is simple: Technology should be expressed as a chunk of the business rather than as an arcane application such as ERP or CRM. Shaygan Kheradpir, CIO at Verizon, estimates that he has more than 200 services sitting in a repository on his intranet, ranging from things like "credit check" to "customer record." Businesspeople can call for a service in a language they can understand, and IT can quickly link these with other services to form a workflow or, if need be, build a new application. These applications can be built quickly because complex, carefully designed interfaces allow developers to connect to the services without having to link directly to the code inside them. They don't even have to know how the service was built or in which type of language it was written.

The second concept currently driving enterprise architecture is events. Pioneered by telcos and financial services companies, this involves using IT systems to monitor a business process for events that matter—a stock-out in the warehouse, for example, or an especially large charge on a consumer's credit card—and automatically alert the people best equipped to do something about it. Together, services and events are revolutionizing the design of enterprise architecture, providing the kind of flexibility and value that CIOs, CFOs and CEOs have been looking for (but rarely have found) all these years.

Services and events do not define EA, but they can form its new core. CIOs who build enterprise architectures without a services-and-events approach will miss an opportunity to address the two most enduring—and accurate—complaints that the business has leveled at IT: slowness and inflexibility.

"We can now promise a new system in days or weeks instead of months," says John Studdard, CIO of Lydian Trust, a bank that has built both services and events into its enterprise architecture design.



Lydian Trust CIO JOHN STUDDARD's architecture allows him to "promise a new system in days or weeks instead of months."

Building the Foundation; Avoiding the Traps

The grail of EA is to create a map of IT assets and business processes and a set of governance principles that drive a constant discussion about business strategy and how it can be expressed through IT. There are many different suggested frameworks for

beginning an enterprise architecture effort. (See "How to Get Started," Page 45.) Most contain four basic slices:

» **Information architecture:** identifies where important chunks of information, like a customer record, are kept and how people typically access them.

» **Infrastructure architecture:** the jumble of hardware and networks.

» **Application architecture:** maps the relationships of software applications to one another.

» **Business architecture:** outlines the company's most important business processes.

This last piece is the most important, but also the most difficult to do. Even if IT can get businesspeople to sit still long enough to go through this exercise, it's often hard to get them to agree on which processes are *most* important.

And once IT gets the businesspeople to focus, then comes the bad news. EA is expensive—between \$650,000 and \$1 million per year for four to six full-time architects, and \$100,000 for outside consulting to get started, estimates Forrester. (For ways to minimize those costs, see “EA on the Cheap,” Page 40.)

But enterprise architects are the future of IT. Grounded in technology but fluent in business, they should be crack consultants, patient diplomats, and able to provide the bridge between IT and the business that most IT departments today sorely lack. (For tips on what to look for, see “Wanted: Enter-

prise Architects,” Page 46.)

Value—and Value Only—Sells EA to the Business

When companies form architecture groups, the first thing they should expect is resistance, according to Hossein Moiin, vice president of technical strategy for T-Mobile International, the wireless phone company. T-Mobile's group of enterprise architects reviews projects to make sure they are soundly designed, meet business objectives and fit in with the overall architecture. “It's a challenge to get buy-in,” says Moiin. “Businesspeople—and some IT people—see it as a bureaucracy. You need to give examples of the value.”

For example, one T-Mobile project was to create a service that would let subscribers customize their ring sounds. The project group assumed that it would have to create most of the software from scratch. But the architecture group found code that had already been written elsewhere at T-Mobile that could be used as the basis of the devel-

opment effort. The reuse reduced the development cycle time by a factor of two, says Moiin. “Show a few of these to the troops and they become convinced that architecture review is a good thing,” he says.

At insurance company The Hartford, the review process helped prevent a new online agent portal from being built in an architecture that wouldn't scale with the business's plans for the system, says Ben Moreland, assistant director of application infrastructure delivery. “We anticipated adding more functionality to the portal and a higher volume of users than the project initially predicted,” he says. “By doing the review early on, we were able to scale up the application design before it became a problem.”

Business (and EA) Is About Compromise

CIOs we spoke to are divided about whether the traditional architectural exercise of mapping every server in the company is worthwhile. Indeed, for some companies, especially big, decentralized ones, it may be impossible.

EA WITHOUT THE STRATEGY

When you build an enterprise architecture, it's more important to understand the structure of your business than its strategy. And you can do that even if your CEO never talks to you.

Enterprise architecture is supposed to be a way to align IT with the strategy of the business. But what if your company doesn't have a clear-cut strategy? (And, no, being *numero uno* in your market is not a strategy.)

Understanding how your business is organized—how integrated and standardized its information and processes are—can help you build an EA that will serve the company's strategic needs, whatever they may be, says Jeanne Ross, principal research scientist at the Center for Information Strategy Research at MIT.

Let's use some simple examples to illustrate. (We don't mean to imply that these companies lack clear strategies, only that they are so well-known that it's easy to make the process-to-strategy connection.)

At UPS every package is delivered the same way everywhere in the world (that is, its processes are highly standardized and highly integrated), and it's vital that headquarters knows where the packages are. (Therefore, its information is highly standardized and highly integrated.) As a result, UPS's EA is almost completely cen-

tralized and standardized.

McDonald's, on the other hand, has highly standard processes (every fry cooked the same way), but HQ doesn't need to know where every fry is at every moment. So McDonald's EA emphasizes total standardization on the computing infrastructure inside the restaurants without information integration between the restaurants.

A financial services company sells different products using different processes, but the opportunity to sell those different products to the same customer means that information,

rather than processes, needs to be standardized and integrated.

Finally, a company with many different independent business units will have little need for standardization of process or information; these companies will be best served by keeping their EA efforts at the individual business-unit level.

“We've been taught to wait for the business strategy to be defined and then build an IT architecture to fit,” says Ross.

But in the real world, your world, that strategy may never be defined and IT certainly can't afford to wait. —C.K.

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Mickey Lutz, CIO of one of those large, decentralized companies, Cendant Travel Distribution Services, is "not a fan of the big, broad mapping exercise." His compromise? Map only as projects demand it. "We had a segment of the business that did the mapping exercise for their area, but it was project-driven"; they were creating some Web services and needed to know where all the applications and data were. "Architects can't be seen as sitting in an ivory tower," says Lutz, a former architect. "You have to get out into the project teams and do the mapping as the business needs it."

This kind of sensitivity to the needs of the business is what separates the new, more effective EA implementations from the old, IT-centric efforts. "In the old days of our enterprise architecture team," says Godfrey, "there was a view that you want one billing system across the company, no matter what. But it doesn't always make sense to force everybody onto one system. The enterprise architects need to know when to compromise and when to put their foot down."

At Cendant, which provides approximately 47,000 travel agencies with schedule and pricing information, Lutz and his architects have learned when to compromise. If, for example, speed to market is critical in developing a new product, Lutz's architects will skip the review process. New ideas will sometimes get a pass so that project teams can feel free to make frequent changes. "We are not rigorous on architecture for architecture's sake," he says.

Pushing the business in a direction it doesn't want to go can kill an EA team. "You have to create influence, not just authority," says Jeff Gleason, director of IT strategies for the Financial Markets Group at insurance company Aegon USA.

To build that influence, architecture groups need to connect with the business strategy of the company. One way to do that is to create a higher-level enterprise architecture committee (with business representation) that oversees the enterprise architects. Another is to devote a portion of architects' time to consulting with businesspeople about the IT projects they'd like to see. Whether through formal governance mechanisms or informal meetings with businesspeople, the enterprise architects are the CIO's strategy research group. The CIO gathers the

EA NEEDS GOVERNANCE

If enterprise architecture is about the business (and it is), you need to get the business involved

An EA group is most effective when it knows more about the business than individual application project managers do. That means building governance mechanisms to get that knowledge.

At T-Mobile, the central EA group is divided into four clusters, according to key technologies across the company. In addition to the four technology clusters, there's a business cluster composed of businesspeople from strategic planning, marketing and sales. This business group focuses mostly on developing ideas for new products that can be delivered through the enterprise architecture. It provides a crucial link between IT and business strategy that is part of, rather than separate from, the EA process itself.

That's the link missing from most EA efforts; certainly it was missing from earlier efforts at T-Mobile, says Hossein Moiin, vice president of technical strategy for T-Mobile International. "You need to consider who the customer of the architecture is," he says.

"In the past, our efforts have suffered because we failed to engage the right people."

Governance is the way to reach (and keep reaching) the right people.

—C.K.

feedback from the architects and uses it to build links between IT and the business.

And the biggest of those links is services.

Why Great Services Demand Great EA

Shaygan Kheradpir doesn't get many accolades for doing his job. But when he starts talking about Spider, the Verizon CIO becomes a rock star. "Spider is the one thing I get a standing ovation for in meetings with the business," he says. Spider is a search engine that can find a customer record anywhere within Kheradpir's architecture.

And there are many places to look. Verizon is composed of three different companies (GTE, Bell Atlantic and Nynex), each with its own complex, customized computing infrastructure. But thanks to an initiative he began while CIO at GTE and carried over to Verizon in 2002, Kheradpir found a way to fish for customers in the waters of all three companies. "At GTE, we had a program called 'Oneness' where we were trying to consolidate different systems," he recalls. But Kheradpir's engineers advised against it. "They said we should not do a big-bang consolidation but rather build a common set of Web services across all our systems."

So instead of trying to consolidate all the systems that contained customer informa-

tion, Kheradpir's engineers built Web services that encapsulated the business rules and could access the right data repositories. The service was difficult and expensive to build, but it had to be built only once. It's wrapped in an interface (also complex and difficult to build) that makes linking with the customer records simple. If a developer builds a new application that needs to link to customer information, he can write a quick, simple Web services-based link to the customer record interface, rather than building individual integration links with all the different systems around Verizon.

"Building something like Spider from scratch would have taken years in a company as big as ours," says Kheradpir. "But because we had the customer record service in place as part of our enterprise architecture, our teams could build it in two months. It's our Google, and the customer service representatives love it."

But there is such a thing as too much popularity. "When the customer record service became available, developers just started grabbing it," he recalls. "But they forgot to tell people on the back end that they were going to multiply the load on their servers by 100 to 1,000 times. Finally, we just had to cut it off."

This forced Kheradpir to recognize that his growing stable of services needed the governance inherent in EA. So his architects cre-

ated a repository on Verizon's intranet where the services are created, published and managed. Anyone can look at the services—such as credit verification or address validation—but to work with them, you need clearance from the EA group and IT, which considers the needs of the project and the load it will place on the infrastructure. The group then negotiates service-level agreements with the business and determines who will pay for the use of the service—no easy feat.

The enterprise architects have incorporated services into the initial architecture review process too. Kheradpir found that project managers were skipping opportunities to build services during the application development and integration stages of their projects. It was viewed as extra work. So Kheradpir made it a condition for the review process. "We had to give incentives to developers to develop the Web services," says Kheradpir. "When they say they want to develop a

certain functionality, we say, 'You can do that, but you have to build a Web service also.'"

Though the developers grumbled at first, they eventually saw that everybody wins with a rapidly expanding repository of services. "This is going to be our strategy for enterprise architecture," says Kheradpir. "Now developers can go to the website and grab a service and start coding the higher-level application they need, rather than spending so much time at the integration and infrastructure level."

What You Need to Know About SOA

Services require a new kind of architectural thinking. Services are more like software products than they are coding projects. They have to appeal to a broad audience, and they need to be reusable if they're going to have an impact on productivity. According to Frank Barbato, enterprise architect for Lydian Trust, to get developers, who generally like to do things on their own, to use services, "you have to show them who else is using it and the track record; you're selling it to them almost like they were an external client."

Planning—not just with IT but with the business—is critical. The first big issue is what SOA geeks refer to as granularity. Early forms of services were defined at too low a level in the infrastructure—"print" or "save" are simple examples—to interest the business. The new generation of services are being defined at a higher level; they describe a chunk of the business and have value for it too. For example, "credit check" has value not just for programmers who want to use that code in another application, but also for businesspeople who want to use it across multiple products—say, auto loans and mortgages—or across multiple businesses.

But defining the right level of granularity is harder than it may seem. At T-Mobile, Moiin tries to start at the highest possible level of granularity, and then work his way down. That way, the first service becomes an anchor and guide to the next level of services. For example, T-Mobile built a high-level service called "send a message." Since then, the architecture team has built more granular services, such as "send an SMS message," to send messages in a specific format to different

devices (cell phones, pagers) that customers use to tap into the T-Mobile network. With this kind of big-to-small methodology, Moiin avoids building services that no one needs.

The Link Between Services and Events

Events are the eyes and ears of the business expressed in technology—they detect threats and opportunities and alert those who can act on the information. If services make enterprise architectures more flexible and responsive, events make them more alert and better prepared to sense problems before they become disasters (and sense opportunities before they're lost). Using events to drive architecture design brings IT closer to having a direct impact on the business's P&L.

And, like services, events can be expressed in terms that businesspeople understand. "CEOs and CFOs are event-driven people; it's how they solve problems," says David Luckham, professor emeritus of electrical engineering at Stanford and one of the leading lights of event-driven systems. "When problems get pressing enough, they begin looking at the series of events that led to the problems to see what happened and what they can do about them."

IT needs to begin architecting systems in the same way, say the event gurus, starting with events that matter to the company (supplier shortfalls, long wait times in the call center) and building IT systems that monitor and respond to those problems. For example, when the system that monitors a credit card transaction processing system sees a \$10,000 charge come in on a credit card with a \$2,000 limit, the system sends an alert to a credit supervisor and automatically shuts down the account.

Though, traditionally, they have been viewed as separate technologies, services and events are converging. Because service-oriented applications and workflows are so loosely linked, with developers writing links to services whose design and application composition they may not fully understand or control, developers need to consider events in their designs.

For example, Lydian Trust's enterprise architects designed a service called "get credit" that is used by several different prod-

HOW TO GET STARTED

Some standard templates can jump-start your thinking about enterprise architecture. But don't expect them to provide all the answers. "Frameworks are the filing cabinet you put the architecture documents into," says Bruce Robertson, vice president of enterprise planning and architectures for research company Meta.

» One of the most popular—and free—frameworks is the Open Group Architecture Framework (Togaf). www.opengroup.org/architecture/togaf

» Though developed specifically for U.S. government agencies, the Federal Enterprise Architecture Framework (FEAF) has relevance for private companies too. www.feapmo.gov

» John Zachman, considered to be "the father of enterprise architecture," offers up a version of his framework for free. www.zifa.com/framework.html

uct divisions within the company for different loan application workflows (autos, mortgages and so on). "Get credit" is a Web service that seeks out credit ratings over the Internet from the major credit bureaus.

One day, one of the credit bureaus' Web servers went down for hours. When Lydian Trust's "get credit" service tried to make the call, there was no answer. Because the connection to the server was loosely linked, the system didn't know what to do. "Get credit" hadn't been built to make more than one call. So while it waited for a response, hundreds of loan applications stalled.

Loan officers had to work overnight to make sure the applications were completed within Lydian Trust's promised 24-hour response window to customers. Customers never felt the pain, but CIO Studdard and enterprise architect Barbato certainly did. "There are many more dependencies in a services environment," says Studdard. "The system has to be able to deal with the existence of certain events—or the lack of an event—in a way that doesn't interrupt the overall flow." For example, "get credit" is now programmed to keep calling the credit bureaus' servers for 22.3 hours before giving up. If the service hits a snag, an e-mail alert goes to an IT manager and automatically gets sent to a higher authority if that person doesn't respond. "This is not the kind of stuff that's available out of the box," jokes Barbato.

EA Magic

Very little having to do with enterprise architecture is available out of the box. It is a competency that must be built from within, unique to each company and that company's culture. But developing that internal capability is critical to bridging the value gap that persists between IT and the business today. Internal IT groups simply have to become faster, more responsive and more flexible to survive in this era of automation and outsourcing. "If I had a wand and I could wave it, I would make everything happen a lot faster in IT," says Alan Buckelew, president and CIO of Princess Cruise Lines.

Building an enterprise architecture based on services and events is the best wand Buckelew—or any CIO—could wield today. **CIO**

Executive Editor Christopher Koch can be reached at ckoch@cio.com.

IT has grown so big that the CIO can't handle it all.

B Y B E N W O R T H E N

In 1975, Baldev Singh was at the pinnacle of his profession: rally racing. He was sponsored by Volvo and Fiat. But in the middle of his fourth East African Safari Rally—a three-day, 3,000-mile dash across Kenya, Tanzania and Uganda, a race that only about 15 of the 300 or so cars that enter ever finish—his life changed.

Singh was barreling up a hill, pedal to the metal. As he reached the top, he saw a child selling peanuts in the middle of the road. Singh jerked the wheel and went careening off the road.

Roads in East Africa aren't like those in the United States. "Once you go off the pavement, you can't control the car," Singh explains. He rolled several times. The car was totaled. Fortunately, Singh was able to walk away. But he decided it was time for a new career.

Twenty-nine years later, he walked

Reader ROI

- :: What an enterprise architect does
- :: How CIOs should approach hiring an enterprise architect
- :: The skills architects believe are prime success indicators

WANTED: ENTERPRISE ARCHITECTS

To ensure that IT is always aligned with the business, you need an enterprise architect.

Must Be
Charismatic,
Extroverted,
Technologically
Sophisticated and
Business-Savvy

into Toby Redshaw's office, where Motorola's corporate vice president of IT strategy, architecture and e-business immediately realized that Singh was just what he was looking for in an enterprise architect.

Redshaw needed someone who had both a deep technical background and a good understanding of the business, skills that Singh, who had earned engineering and computer science degrees and an MBA since he quit racing, had in spades. But that wasn't what clinched it for Redshaw.

"An enterprise architect is going to get a lot of pushback," he says. Changing the way a company thinks about IT and the way IT thinks about the business is not easy. "You need someone," says Redshaw, "who has done something like drive across Africa at breakneck speeds. Someone with persistence. Someone tough."

The Enterprise Architect: A Job Description

An enterprise architect is the person who conceives, designs and oversees the implementation of a company's systems development. While the concept of enterprise architecture is old, the position of enterprise architect is new, and has become relevant recently with the emergence of Web services and the move toward service-oriented architectures that enable IT components to be used in multiple applications. (For more on the new enterprise architecture, see "A New Blueprint for the Enterprise," Page 38.) GM, Procter & Gamble, Wells Fargo and agencies such as the Food and Drug Administration have all hired enterprise architects, and experts say that having one to oversee the building of a company's overall computing environment is critical to both business and IT success. "Architecture works only if you have the right people staffing it," says Dow Jones CIO Bill Godfrey.

The enterprise architect is responsible for ensuring that each and every one of a company's IT decisions is made with its impact on the entire organization kept firmly in mind. It is the architect who prevents an organization from investing in a technology that it will eventually have to replace. It is the architect's job to look for common business

processes throughout an organization so that the services IT creates can be reused. For example, when IT is designing a mortgage approval application, the architect's job is not simply to make sure it will benefit the business unit that requested it, but to guarantee that it can be used by every business unit that touches upon the mortgage approval process.

With a title like architect, you'd expect the job to be about building things, but a more accurate analogy might be city planner. Unlike a building, a company's IT architecture is never complete. Furthermore, an enterprise architect needs a high-level view that takes into account applications, data formats and hardware platforms, and how these three parts of IT interact, much the way a city planner has to consider a new

building's impact on sewers, traffic and the electrical grid. The need for such knowledge is one reason that a systems or software architect is usually not a good candidate for enterprise architect.

The systems architect is an expert in one particular field, say, application development. But the enterprise architect needs to be a generalist, with a rich understanding of applications, data and hardware. "I can configure a workstation or a LAN in two hours," says Dan Dixon, chief architect for Wells Fargo. "But the truth of the matter is, that isn't the level of detail you want with an architect. It's great that I've been there, but my job is to see how things fit together."

Another reason not to promote the top systems architect is that enterprise architect is as much a business position as it is an IT

MASTER BUILDERS

Architects on architects

Dan Dixon, Chief Architect, Wells Fargo

Background: In the early '70s, Dixon was thinking about pursuing a career as a music engineer, moonlighting as a programmer to help pay the bills. By the 1980s, the music died and he was leading programming groups. By the '90s, he was CTO of John Hancock Financial Services when that company was trying to go public. "One of the skills I learned then was how to explain to businesspeople what IT was doing," he says. When Dixon left John Hancock, he became a consultant, where he found himself in the opposite role: "I spent a lot of time trying to explain to tech people what the business issues were and why they were important." He says he needs both skills to be a successful architect.

What to look for in an architect: "Businesspeople tend to be extroverts, whereas 75 percent of IT people are introverts. You have to be able to relate to both."



Gary Washington, Chief Enterprise Architect, U.S. Food and Drug Administration

Background: Washington has worked in IT for the military, for the private sector at Automated Research Systems, and for the government, doing everything from programming mainframes to leading ERP projects at the Office of Business Innovation, a little-known government organization, and the Department of Health and Human Services. "I think this [diversity] made me more flexible," he says. "And it's not just business versus IT. The military is quite different from private business, which is different from the government."

What to look for in an architect: "They need to have a passion for tying things together; they should be constantly thinking about the big picture."

one. "The systems architect is given a set of requirements and told to build an IT system," says Jay Jaiprakash, chief architect and integration manager for National Electronics Warranty (NEW). "The chief architect's job is to take the business architecture and derive the IT architecture from it."

More important, the enterprise architect needs a broad enough understanding of the business to recognize where processes—or parts of processes—repeat, as in the aforementioned mortgage example.

"The position [of enterprise architect] demands people who possess the qualities, skills, business acumen, experience, and discipline to ensure business and IT architecture alignment," says Meta analyst Philip Allega. He also suggests that finding a qualified architect, which is already difficult, is only going to get more difficult as more companies start enterprise architecture projects.

Most CIOs have never before sought

someone with this mix of business and IT skills. The good news is that top architects have a lot of things in common, some of which show up on résumés and some of which you need to uncover in the interview. Here's what to look for.

It's Not About the IT Until It Is

The ideal enterprise architect has extensive IT and business experience. Jaiprakash, for example, has a master's in computer science and an MBA. Laurence Laning, P&G's global IT architect, has experience managing a production line and working in R&D, in addition to his PhD in computer science and years of IT work.

This broad background is important because "the architecture is *not* driven by IT," says Gary Washington, chief enterprise architect for the FDA. "It is driven by business, and the best people to get business

requirements from are businesspeople." In order to find out what those requirements are, the architect has to understand how businesspeople think.

In fact, it's best to think of the enterprise architect as a translator. The businesspeople tell the architect what they need to do. The architect in turn designs an IT project that will meet those needs and is consistent with the IT department's overall strategy.

For example, NEW sells and administers warranties on products for companies like Best Buy and Lowe's. Each company wants a different amount of information about the reasons their customers contact NEW, which can help them identify defective products, print better manuals and so on. "One client wants to know only when we send someone to fix something and needs that information only once a week," Jaiprakash explains. "Another wants to know *every* time a customer contacts us, even if it's just to get the manufacturer's phone number. And that company may want updates every 15 minutes." Jaiprakash had to take these requirements, identify their commonalities and build one system that would automatically inform all of NEW's clients when they wanted to be informed and with the degree of granularity they desired.

This problem, he determined, was fundamentally about data—customer data, product data, warranty data. The key to building one system that could meet every customer's needs was to identify every possible data component so that each customer could piece them together in ways that would classify any type of interaction. "Once you do that, it becomes easy to develop the system," he says.

Because what the architect finally produces is a system blueprint, most architects say that it is more important that he has technological expertise with business experience than the other way around. There are two other reasons: First, unlike business processes, which the architect needs only to understand, the architect is responsible ultimately for making the call on how an application will be built and which technologies a company should invest in. A deep technical background increases the chances that he will make the right decisions. Second, the

Rick Sweeney, Chief Architect, Blue Cross Blue Shield of Massachusetts

Background: Sweeney has degrees in finance, accounting and business administration, and worked in the credit division at Wang Credit until the late 1980s, when his interest in accounts payable and receivable systems landed him in the IT strategic planning group. Over the years he has worked as a consultant and taught information technology classes at UMass-Lowell. "The class had everyone from bookkeepers trying to learn a new skill to network engineers," he says. "It taught me how to explain [IT] concepts to different people."

What to look for in an architect: "I would look for excitement and passion. If I ask them about a project they've worked on, I want them to say, 'Oh yeah, you should have seen what we did,' and then talk for the next 20 minutes. He didn't just do it; he lived it."

Laurence Laning, Global IT Architect, Procter & Gamble

Background: Laning has been with P&G for more than 25 years, beginning as the manager of a production line in the paper business. After getting a PhD in computer science and engineering, he started working for the sales organization and also worked in R&D before settling into IT. "Breadth is very helpful," he says. "It's helped me build credibility." He also knows enough business terms to never have to use the phrase *enterprise architecture* when talking to businesspeople.

What to look for in an architect: "You can't just talk a good game; you have to deliver. I would ask someone to give an example of a strategic project they've led that brought together business and IT. Get them to focus on the key attributes that made that project work. Also, they need to be able to speak strategically and know the right level of detail needed."



architect also needs to direct the programmers who will build the system. "Without technical depth, you don't have the credibility to do this," says Motorola's Redshaw.

Talking Across Silos

Enterprise architects need to be extroverts, and they have to be exquisitely sensitive to other people's needs and reactions. "You have to be politically savvy," says P&G's Laning. Because the value of enterprise architecture is not always obvious in the short term, "you need selling skills and the ability to deal with senior management."

For example, Laning found himself in the odd position of having to convince his CIO and other business leaders to reject a proposal from a group of senior IT workers. It happened like this:

ate a problem (it eventually would have to be replaced or changed at great expense) in language P&G's business leaders could understand, Laning won the argument.

"What I was able to do was get the right data to the right people," he says. He was also able to placate the IT department. Instead of reveling in his victory, he challenged the team to keep working on the problem. And now, a year and a half later, they have created a content management application that handles both workflow and collaboration.

So Where Do We Find This Wonder Worker?

Finding someone with the broad background and the personality required to be an architect is difficult at best. And most architects agree that the best predictor of success

technologies and business processes. The enterprise architect needs to be able to lead the team and the IT people who will turn his blueprint into a system.

Enterprise architects believe the good ones are born, not made. While many of the skills needed to do the job can be learned, the two biggest success indicators—a passion for problem-solving and an extroverted personality—are things you either have or you don't. Unfortunately, these traits don't often come together in one package. Experience tells us that puzzle-solvers tend to be quiet and bookish, and extroverts tend to grow impatient with details. "Someone with all the [necessary skills] is a rare commodity," says Redshaw.

The best way to find out if the person you are interviewing has this combination is to test him, says NEW's Jaiprakash. "See if he

An enterprise architect needs a high-level view that takes into account applications, data formats and hardware platforms, and how these three parts of IT interact, much the way a city planner has to consider a new building's impact on sewers, traffic and the electrical grid.

In order to save money and have access to potentially innovative new products, P&G came up with a business goal of having 50 percent of new product development come from sources outside the company—universities and private research labs. IT came up with a content management application to help keep track of the new products. Laning didn't like the application, noting that while the package was good on workflow, it didn't offer the necessary collaboration tools that would easily enable outside partners to work with P&G. He didn't have an alternative and instead argued that it was best to wait for an appropriate product to be developed. The architecture group and the IT department "got into a bit of a holy war," he says. But because he was able to articulate why the content management technology would cre-

as an enterprise architect is, well, experience as an enterprise architect. It's the CIO's own chicken-and-egg conundrum: The position is new, yet the best person for the job is someone who's done it before.

A viable substitute for that experience, says Wells Fargo's Dixon, is a background in consulting. (Dixon, in fact, was a consultant himself before going to Wells Fargo.) "A consultant has to read the tea leaves very quickly and find out what the business problem is," he says. "You have to know how to pull everything together." In fact, many architects consider themselves internal consultants, with the exception that they stick around to make sure the project gets done properly.

A good architect also has to be a good leader. He almost always has a team working under him, populated by experts in various

can solve a business problem," he says. "It doesn't have to be a huge one since really you are testing his approach. Make him explain a business architecture and translate it into a data architecture. Have him do it for a panel of different people or in separate one-on-one interviews. It's really just the same question three different ways, but he needs to be able to do it all."

Finally, when you do find your enterprise architect, he should report directly to you.

"If it wasn't for our CIO, I wouldn't be able to do what I do," says the FDA's Washington. "He's the one who has made enterprise architecture a top strategic position. Our success is a result of his vision." **CIO**

Senior Writer Ben Worthen can be reached at bworthen@cio.com.



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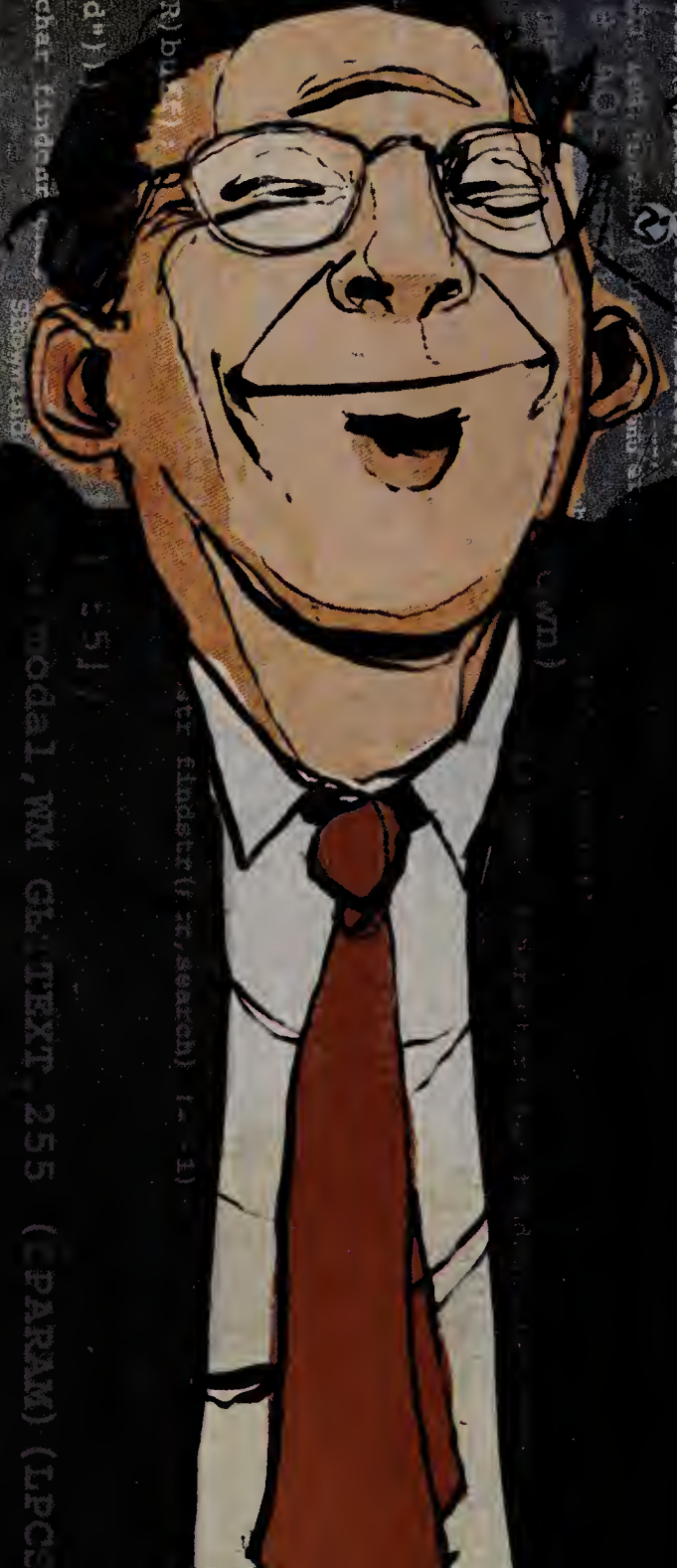
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Raining It's Code!

(Hallelujah?)

As open-source development options proliferate, CIOs are finding ways to make it work for their organizations

BY CHRISTOPHER LINDQUIST

THE NEXT TIME you have a project in need of a software solution, try an experiment. Go to open-source collaboration site SourceForge (www.sourceforge.net), and spend five minutes running a search. The odds are good that you'll find an open-source project related to your problem. Free. No sales calls. No negotiations with vendors.

Granted, no service contracts or tech-support numbers either, most likely. But given the low barrier to entry, it's easy to understand why thousands of companies are tempted to use open source for, at the least, those projects that fall shy of the mission-critical line. And for those CIOs nervous about the support and licensing issues that surround open source, well-known vendors are increasingly releasing some of their own code to the open-source community. IBM, for example, in January released 500 of its software patents to open-source software developers. Sun has announced that it will release its Solaris operating system under an open-source license.

Of course, if you're looking at open source precisely because you want to get away from those very vendors, maybe there's a better alternative: a cooperative of like-minded, open-source-loving CIOs just waiting for you to join. The options for using open source have never been greater, and you owe it to yourself—and your company—to take a close look.

Reader ROI

- :: Why CIOs are growing more interested in open source
- :: How some CIOs are banding together in software development cooperatives
- :: Why some vendors are releasing product code to the open-source world

Power of Cooperation

One of the challenges of using open source is simply finding a product that meets your needs and your quality standards. While many developers need an e-mail client or Web browser (hence, the rabid developer base for open-source projects such as Mozilla's Thunderbird and FireFox), finding a spontaneously developed tool to integrate your three retail-specific supply chain applications isn't as likely. And even if your SourceForge search uncovered such a tool, there's no guarantee that the developers wrote it with the care your enterprise requires. (To at least partially address this concern, VA Software offers SourceForge Enterprise Edition (SFEE), which helps developers create shared code environments among known collaborators, and the Tapestry portal, which lets Enterprise Edition users access information about other SFEE projects.) Plus there's the "where did this code really come from" legal question. To assuage these fears, some organizations have turned to cooperation with peers for their open-source development.

One of the most high-profile examples is the Avalanche Corporate Technology Cooperative, a collective development effort founded by a group of Minnesota-based companies, including Best Buy, Cargill and Jostens. Last spring, the group formed to identify opportunities for open-source development projects that could benefit all the members. The goal of this cooperative is to pool resources so that interested companies can jump into new projects while spreading out the risks and expenses. Some of the members, for instance, are too small to create full-blown development efforts on projects such as building an open-source desktop reference environment, but by combining efforts, they can all reap the rewards. Avalanche currently has a half-dozen projects under way, including one to create a reference design for an open-source desktop and another to build a business activity monitoring engine.

"We're relative novices in the whole open-source area," says Mike Thyken, senior vice president and CIO at bedding manufacturer and Avalanche member Select Comfort. "We started looking at everything it was going to take to get a Linux/open-source world put together, and we saw that it was very redundant between companies."

So Select Comfort joined Avalanche, contributing a membership fee of \$30,000 as well as some time from technical architecture experts inside the company to Avalanche's Linux reference environment project. As a result, Select Comfort expected to receive deliverables on a Linux desktop and server architecture early in 2005, all for a "fairly modest" investment of money and time, Thyken says—far less than if the company had attempted the project on its own.

Aside from the efficiencies of cooperative development, Avalanche members can receive other benefits as well. Avalanche's licensing agreement restricts the cooperative's code to members only, eliminating the fear that valuable code will simply be spread far and wide, without competitive benefit to the contributing members. And then there's the question of putting pressure on commercial software vendors.

"One of the original premises was that the balance of power had swayed quite heavily to the vendor side," says Jay Hansen, CEO of the cooperative. "The IT consumer wanted to take back a little bit of the control over their own destiny."

Financial services companies are getting in on the open-source action as well. What began in 1997 as an internal effort to consolidate integration development at international investment bank Dresdner Kleinwort Wasserstein (DrKW) has become Open-adaptor, a Java-based open-source integration platform. "The most common thing you have in a bank is communication between systems," says Steve Howe, DrKW's vice president and head of open-source initiatives. In the late 1990s, the company set out to create a standardized programming interface that would keep internal developers from having to reinvent basic code for every new project. The code behind the interface was shared with all of the company's developers, and each was able to make suggestions for—and sometimes even changes to—the source code. The result was a dramatic decrease in development time for connectors.

The system worked so well, in fact, that DrKW hired software development collaboration provider CollabNet, which hosts collaborative development environments for both commercial and open-source projects, to release its connector platform in open

Sources on Open Source

In Print

The Success of Open Source

By Steven Weber

Open source from a political scientist's point of view, with plenty of history and educated conjecture about the place of open source in software development and life in general.

Succeeding with Open Source

By Bernard Golden

Primarily aimed at software vendors considering the open-source way of life, Golden has advice for any company considering open-source projects.

Open Source Licensing

By Lawrence Rosen

Down-to-earth legal advice on dealing with open-source licenses from an acknowledged expert in the field.

On the Web

Open Source Initiative

www.opensource.org

The root location for all things open source. Includes definitions, approved licenses, news and a mailing list.

Freshmeat

www.freshmeat.net

"The Web's largest index of Unix and cross-platform software, themes and related 'eye-candy,' and Palm OS software," according to the literature. While not all of its content is open source, the Freshmeat folks prefer that products be released that way.

SourceForge.net

www.sourceforge.net

Tens of thousands of open-source projects, all in one place. Search for free, start your own project, or join and get access to extra features such as project monitoring, which lets you know whenever changes take place in a particular project.

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source as the organization Openadaptor. DrKW wagered that if other organizations got involved, it would result in further enhancements to the platform. The idea worked. The core software currently sees more than 8,000 downloads a month of the organization's site. And while no one knows exactly how many corporations are taking part, Howe says that Deutsche Bank, Hallifax Bank of Scotland, Hewlett-Packard, J.P. Morgan Chase and the Royal Bank of Scotland are all involved.

Howe notes that Openadaptor is a case of an open-source product unlikely to see a commercial competitor. "The really good thing about Openadaptor is that it's really lightweight. There's not much real impetus for the vendors to put that sort of thing out; they couldn't charge very much for it," he says. In other cases, the project could have a more dramatic impact on an existing vendor. Such is the case with Sakai.

Costs and Competition

The Sakai Educational Partners Program is a set of projects spearheaded by universities looking to provide common platforms for a variety of tasks. One of those tasks is the creation of an open-source course management system—one aimed directly at a technology space currently occupied by Blackboard and other commercial competitors.

According to Sakai Community Liaison James Farmer, a recent survey of 22 universities currently using Blackboard found that 100 percent planned to drop the commercial product in favor of Sakai code. But Farmer is clear to point out that this project isn't about vendetta; it's about saving money. Having an open-source, cooperative development option would let schools reduce their costs by skipping commercial alternatives completely, or indirectly, by using the threat of open source to "put some restraint on price," Farmer says.

Malcolm B. Brown, director of academic computing at Dartmouth College, agrees with that assessment, noting that he wouldn't be afraid to use Sakai as leverage with his vendor. But he says cost is secondary to functionality. An admittedly happy Blackboard customer (he had zero downtime on his course management system last term), he says that the school is nevertheless keeping an eye on Sakai to see if it can provide a bet-

Open Law

Don't forget to run it by your lawyers first

EVEN IF YOU get your open source from one of the "safer" alternatives, be sure to get a legal review. The Open Source Initiative (OSI), the nonprofit group charged with promoting open source, currently recognizes more than 50 open-source licensing models, each with its own nuances and potential gotchas. And Black Duck Software, which provides intellectual property management systems for open-source and commercial software users, says it has found another 300-plus licenses outside the OSI's list. The key is to actually read the things, and then let your corporate lawyers do the same.

"You have to decide what license terms you're comfortable with, and be prepared to tell [your lawyers] that 'none' is the wrong answer," says Mike Milinkovich, executive director of the Eclipse Foundation.

But former OSI General Counsel Lawrence Rosen says he hopes for a day when licenses get winnowed down to a reasonable selection to cover most needs. "At some point, they will realize that their software won't be adopted if it requires the analysis by their customers of yet another license with only subtle differences from those already approved," Rosen says.

Users can also seek other protections. Vendors are increasingly providing indemnification for their open-source customers. You can purchase indemnification from Open Source Risk Management (OSRM), a group that also offers open-source risk consulting services. And even state laws can help.

For instance, "[The Avalanche Corporate Technology Collaborative is] incorporated under the Minnesota co-op laws, which gives us the ability to exchange code under some kind of legal umbrella," says Select Comfort Senior Vice President and CIO Mike Thyken. —C.L.

ter product than the commercial alternatives. "The promise of Sakai is that it's written by universities for universities," Brown says, noting that university developers should be more aware of the complex relationships that can grow between educators and IT. "It can be tough to make all [the instructors] conform" to an application, Brown says. "The platform needs to be customizable and nimble." And if Sakai can deliver on those needs, he says, Dartmouth would consider moving to its platform. But for now, he notes, "It's too early to see how this is going to play out."

Getting the bulk of educational institutions moved to a single platform would save money in another way as well. "If you can interchange content, you will sharply reduce the cost of instruction," Farmer says. For instance, "McGraw-Hill produces 24 versions of its materials to support all the electronic teaching systems," including Blackboard. "If they could reduce to one standard, they could cut the cost of their media support by 80 percent. Textbooks are expensive because faculty members are judging not just on textbooks themselves, but on the quality of

the other materials available for their online courses." Sakai, if widely adopted, would provide that single platform.

What began as a cooperative effort among four schools—Indiana University, MIT, Stanford and the University of Michigan—has grown to include more than 50 schools, including the bulk of the most prestigious purveyors of higher education in the world.

But while these cooperative efforts all are success stories (at least for now) it doesn't mean every corporation should immediately look to join a cooperative or start its own.

"If you're not comfortable using anything other than packaged software, we're probably not for you," says Andrew Black, vice president and CIO at Avalanche member Jostens.

Vendors Open Up

For companies not inclined to stray far from the warm comfort of packaged products, there are more open-source options offered by the vendors themselves. Reacting to pressure from existing open-source projects and intrigued at the idea of expanding their developer base dramatically for minimal costs,

many large vendors are even releasing some of their own products as open source, offering the software's source code for free and allowing users to make changes as they see fit. Computer Associates, IBM, Novell, even Microsoft (on a tiny scale), have released source code for community use and development. And a number of smaller vendors—including Chalex, Gluecode Software, JBoss, SugarCRM and MySQL—are built on an open-source foundation.

Customers need to look at such pronouncements with a skeptical eye, however, as many vendors may see open source as an easy way to dump old products. And in those cases, the open-source effort benefits no one.

The idea of having "one throat to choke" when something goes wrong, the legal indemnification some vendors provide against lawsuits concerning open source and the simple comfort of not having to vet one more software application can make vendor-released open source appealing. The vendors, meanwhile, tout open source as a means of helping themselves by reducing development costs and getting customers directly involved in the development process, and they even candidly note attempts to jump-start fading products (Computer Associates with the Ingres relational database) or give birth to ideas that might not have been profitable commercial ventures (IBM's Eclipse development environment project).

But the temptation exists to simply euthanize products by handing them to the "community," thus abdicating further support responsibilities. "Sometimes engineers and product managers make assumptions," says Jeff Hawkins, vice president of the Linux Business Office at Novell. "A common one is 'Gee, I don't have the resources on this, so let's make it open source,' or 'We don't really care about this anymore, so let's release it to open source.'" But, Hawkins says, this almost guarantees open-source failure.

"[You] have to examine [vendors'] motivations," DrKW's Howe agrees. "I think a lot of people are effectively end-of-living products in an open-source way. That doesn't work because you end up with a lot of dead software out there that no one's updating."

That very concern struck Shaf Rahman, group technical director at International Customer Loyalty Programmes (ICLP),

which puts together loyalty marketing programs for companies, after he heard that Computer Associates was going to release its Ingres database—on which many of ICLP's core systems are built—to open source. "I think in the back of my mind there was that thought that 'They've absolved all their responsibilities and given it to the people.'" But his fears were calmed after he saw the orderly manner in which the company handled the transition, plus the fact that CA

For companies not inclined to stray far from the warm comfort of packaged products, there are more and more open-source options offered by the vendors themselves.

was clearly staying in control of the project and carefully vetting any potential contributions to the source code. This provided both indemnification for any potential legal hassles and a well-known source for support services. As a result, Rahman has hopes that Ingres will be revitalized, gaining both new features and, more importantly, new prominence in the marketplace. "In the past, I'd try to recruit people and they'd say 'Ingres? How do you spell Ingres?'"

Some observers see the trend of vendor-released open source as a sign that certain parts of the software stack—particularly those at the low end that have become ubiquitous (think operating systems and integration tools)—simply have very little commercial value left and thus are better supported by their communities, freeing up R&D resources for high value-add products.

"Things like [Microsoft] Word and Excel have become relatively static," says Ian Campbell, president and CEO of Nucleus Research. "That's why you see Linux on the desktop with the [open-source OpenOffice productivity suite] as a reasonable alternative." And, he says, as time goes on, more products will fall into the "best as open source" category.

Lead or Get Out of the Way

Open-source advocates have their own worries, of course. One concern with open source is the threat of the nuclear lawsuit, the legal case that could declare certain open-source

licenses unconstitutional (think *SCO v. the GNU Public License*) or make the burden of intellectual property protection so onerous that software communities are crushed under the weight. But observers argue that legal uncertainties are a fact of life with commercial software as well.

"Is there risk? There's probably some," says Bernard Golden, author of *Succeeding with Open Source* and founder and CEO of Navica, an open-source consultancy. "But

you need to look at all the risks, including the risk of not doing the project."

Simply banning open source probably isn't an option, however. As just one example, software development researcher Evans Data's numbers have shown an almost 200 percent increase in use of MySQL by database developers since 2001—from 16.4 percent to 48.5 percent. And as large open-source projects such as the Eclipse development environment gain steam, the temptation to download and use the tools—rather than wait weeks for a purchase order to clear accounting—will do nothing but increase.

But like anything in IT, the best way to approach open source is with a plan, with skepticism and with the understanding that you're going to need to roll up your sleeves.

"The more you put into something, the more you get out of it," says Mike Milinkovich, executive director of the Eclipse Foundation. "Open source is no different." **CIO**

Technology Editor Christopher Lindquist can be reached at clindquist@cio.com.

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cio.com

ASK THE ETHICIST



As the keepers of the data and the systems that ensure compliance with all the new regulations bombarding business today, CIOs increasingly face moral challenges. Ethical expert Larry Ponemon answers real-life questions on how to resolve these on-the-job dilemmas.

BY MERIDITH LEVINSON

Ethical conundrums simply don't come up on the job,

say 90 percent of the CIOs interviewed for this article. Ninety percent. You'd think that more CIOs would say they had confronted ethical dilemmas given the responsibilities they hold today, the regulations with which they now have to comply and the recent corporate scandals. But so few CIOs acknowledge ethical questions because many IT professionals don't believe their jobs involve value judgments, says Richard T. De George, a professor of philosophy and business administration at the University of Kansas who wrote the book *The Ethics of Information Technology and Business*. "A lot of people who work in this area [of IT] don't see any ethical problems. But just because they don't see them doesn't make them go away," says De George. "It only makes them worse."

"If a CIO says 'I've never faced an ethical issue,' they're not living in the real world," says Larry Ponemon, chairman and founder of the Ponemon Institute, a security and privacy research think tank based in Tucson, Ariz.

As steward for the systems that process and store customer, employee, financial, operational and transactional data, CIOs have to either acquiesce or take a stand when, for example, government contractors demand a company's customer lists to check for suspected terrorists (à la JetBlue) even though the demand violates the company's privacy policy. CIOs are also the go-to executive when the CEO wants erased a digital trail leading to his or her misconduct. These responsibilities can bring unwelcome culpability. For

instance, last year Richard Causey, Enron's chief accounting officer, who had high-level authority over information technology, was brought up on charges of insider trading, securities fraud and falsifying financial statements.

With those scenarios increasingly common and with CIOs failing to acknowledge that their jobs involve complex decisions that often have a strong ethical component, CIOs are in dire need of a crash course in business ethics. To that end, *CIO* retained Ponemon to serve as your ethical compass. Ponemon holds a long list of credentials for this task. An adjunct professor of privacy and ethics, he created the compliance risk management practice at PricewaterhouseCoopers, which deals with business ethics issues, before

Reader ROI

Learn how CIOs should handle ethical dilemmas in the areas of:

- Sarbanes-Oxley compliance
- Offshore outsourcing
- Questionable accounting methods
- Potentially harmful IT systems

founding his own company. Below, Ponemon provides answers to ethical dilemmas that are based on conversations with CIOs in a variety of industries, who were all granted anonymity in order to enable honesty and openness. He will also be fielding ethical questions via e-mail until March 15 on the Ask the Source section of CIO.com.

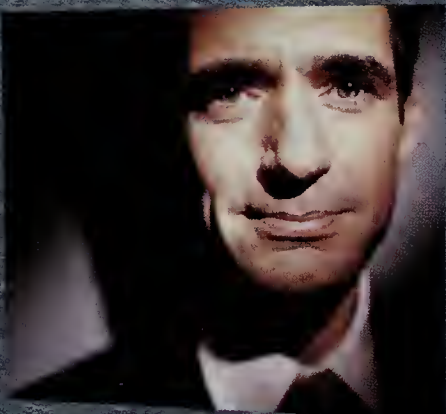
Q: My company can check off completing the IT general control documentation, and we have met the requirements for Sarbanes-Oxley compliance as best as we understand them. But I know in my heart of hearts that the controls in production don't always reflect the way people work. As a result, employees may do work correctly but not follow all the documented procedures required by Sarbox. We're under so much pressure to get Sarbox completed, but the "goal line" seems to be shifting. I can't get a firm answer from my

may be yours). Therefore, I would not take this issue lightly (even if noncompliance with documented procedures doesn't seem to have a material impact on production activities), and I would make sure that this issue gets communicated to management even if it causes missed project completion dates. The good news is that everyone who manages a public company is concerned about Sarbox. It is likely that bringing the issue of a compliance gap to the attention of top management will enhance your reputation as a dutiful employee with superb judgment.

Q: My company is evaluating whether to send programming work overseas to cut costs at a time when we need to stay competitive. If we don't cut costs, we may have to lay off even more staff than if we just lost a few to outsourcing. Do we have a responsibility to our country to keep those

the former Soviet Union. I've run into a situation where work is not being completed over there in the time my company needs it done, and I've come to realize in my trips to Russia to meet with the service providers that they're expecting a bribe from me to finish the work. Offering and accepting bribes is clearly unethical in the United States, but it's just the way business gets done in parts of the former Soviet Union. Do I go along with the bribe? After all, my company needs these applications.

A: Never pay a bribe. Bribes inevitably start a never-ending cycle of corruption and abuse. If the business culture of a nation requires "under the table" or "brown bag" payments, just catch the next Aeroflot flight home. Certain U.S. laws, such as the Foreign Corrupt Practices Act (FCPA), may preclude you from paying a bribe, especially if this business transaction is somehow con-



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—Larry Ponemon, chairman and founder of the Ponemon Institute

audit partners on what exactly is required in order to comply. I understand that this is the first year of Sarbox and that there is no cookbook for this work, but I want my company to be covered. Should I point out potential problems at the risk of slowing down the rollout, or should I just keep quiet?

A: It appears that your compliance program is insufficient given that workplace activities are not aligned with documented internal control procedures. Non-compliance with Sarbox places a huge risk on your company and its top executives. If your company is accused of financial reporting irregularities, the existence of documentation errors may prove that you didn't have adequate financial controls in place. And if the system fails because of flimsy system controls in your department, heads will roll (and one

jobs in the United States, or is offshore outsourcing just a dollars-and-cents, bottom-line driven business decision?

A: Your primary ethical consideration as a member of your company's management team is to keep the company competitive. If the outsourced vendor can do the job cheaper with the same or better quality, then move the jobs offshore. Your staff, however, will likely react negatively to this decision. The noble thing to do in that situation is help them find suitable work elsewhere or help them to re-skill. This would go a long way toward mitigating their anger (see "The Inner Cost of Outsourcing" at www.cio.com/printlinks).

Q: I've started outsourcing some application development work to a part of

nected to a governmental activity. Violations of the FCPA have both civil and criminal penalties for the company paying the bribe.

I advise scrapping the project with the vendor even if it creates a hardship for your company. If this vendor is expecting a bribe, who knows what other nefarious business practices they'll engage in. I wouldn't put it past such an unsavory enterprise to embed defective code in your application just to keep money flowing to them for additional development services and support. As long as you maintain this relationship, you are putting your company at risk.

On the bright side, you can find service providers across the globe, including in Russia, that can perform software development work with great skill and high integrity. In my experience, the key to avoiding problem



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The CIO Enterprise Value Awards honor technology-enabled business achievement. Winners will be chosen from entrants who submit completed application forms to *CIO* magazine by April 15, 2005. Entries will be judged on the value of the achievement resulting from the technology investment and the degree to which it serves the organization's mission. Judges are looking for initiatives that have had a broad and significant impact on the enterprise as a whole.

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- IT vendors, public relations and advertising companies, consultants and other third parties may NOT apply on behalf of another company. They are encouraged to forward the application to the "owner" of the system.
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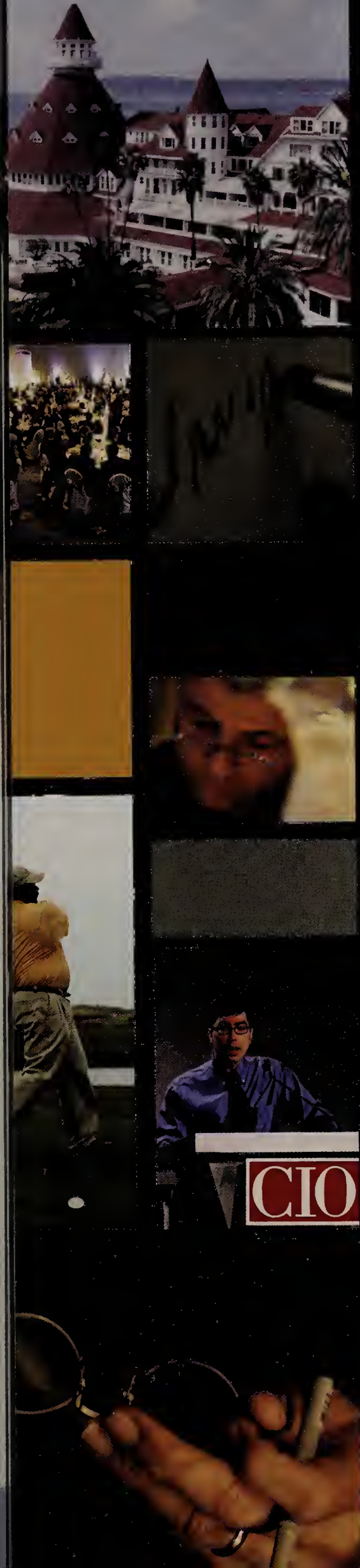
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vendors is to perform rigorous due diligence procedures before outsourcing. Examples of things to look for include: reputation of the company, financial stability, internal quality and security control procedures, background of key employees and references from other reputable companies.

Q: The difference between meeting and exceeding my IT budget lies in the way I treat training costs that accompany a long-term custom development project on my balance sheet. If I count training as a one-time expense, I'll go over budget for the second year in a row, and who knows what the consequences of that will be. If I treat training as an asset and depreciate it, I'll come in on budget and will be rewarded handsomely for doing so. I realize there's been an uproar over accounting improprieties, but treating training as an investment is small in the grand scheme of things, especially since it wouldn't materially impact my company's earnings. Is treating training as an asset in this instance such a bad thing?

A: Frankly, the issue is about distorting reality and not about creative accounting choices. In my 30-plus years of experience I've observed that most companies treat training costs as a business expense and not as an asset. IT training costs are unlikely to be recorded as an asset (or "capitalized") unless the training program is a onetime activity.

If you truly believe that the training fits this type of long-term capitalized activity, then treating it as an asset and depreciating it over time is the right accounting treatment. However, if the accounting decision is based solely on making your budget numbers look good, stop the bookkeeping games. The recording of training costs as an asset distorts your IT department's actual operating results and, in my opinion, would be the wrong decision even if you gain a handsome reward.

Q: I recently found out that software my hospital system is using has the potential to harm patients. While I have no proof of patient deaths that have resulted from this system, my organization recently experienced a close call with it (an order for medication entered at one of our campuses was nearly carried out at another campus for a completely different person than intended).



HELPFUL RESOURCES ON BUSINESS ETHICS

ORGANIZATIONS FOCUSED ON BUSINESS ETHICS

International Business Ethics Institute
www.business-ethics.org

International Society of Business, Economics, and Ethics
www.isbee.org

Institute for Business and Professional Ethics (IBPE) at DePaul University
www.depaul.edu/ethics

Ethical Leadership Group
www.ethicalleadershipgroup.com

Center for Ethical Business Cultures
www.cebcglobal.org

The Ethics Resource Center
www.ethics.org

PUBLICATIONS & BOOKS

The Conference Board
www.conference-board.org

Ethical Corporation Magazine
www.ethicalcorp.com

Harvard Business Review on Corporate Ethics (Harvard Business Review Paperback Series)
 by Harvard Business School Press

There's No Such Thing As "Business Ethics": There's Only One Rule For Making Decisions
 by John C. Maxwell

Fortunately, an astute nurse prevented a medical error executed by the system. After that episode, I recommended to the functional executive in charge of this system that we pull the plug on it, but he thinks as long as we have capable doctors and nurses, we have nothing to worry about. Meanwhile, the vendor has threatened to make my life miserable if I go public with this recent problem. How much pressure can I put on this executive to pull the plug? Should I go to the board?

A: Before going to the board, you must build a case for pulling the plug on this system. Your case should include tangible proof that this software has malfunctioned, which you could find in code debugging logs or in reports on application instability. If in your research you find hard evidence that this system is a danger to patients, go back to the functional executive in charge of the system, share your evidence with him, and tell him you intend to bring your case to senior management if he doesn't pull the plug on the system himself. Giving the executive another chance to do the right thing is a good idea, especially if you have new evidence that may change his perspective. You should also keep your boss in the loop of your findings and proceedings.

If you get pushback from the functional exec, go to the next highest level executive in the organization. It's important to follow the chain of command very carefully when escalating problems in any organization. The board is the last stop. Don't go outside the hospital with this problem unless all else fails. Document the dates and times of each meeting you have with management or the board about this problem with details of your conversations. I also suggest you document the threat from the software vendor. This documentation may be useful in the event the case goes to court.

Meanwhile, be prepared: The consequences of your actions may be hard on you and your family. Most whistle-blowers suffer some sort of retaliation or punishment from their companies and coworkers. However, if you are correct about dangers to patients, your action is heroic. You should feel good about taking the ethical high ground even if others at the hospital scorn you for making waves. **CIO**

Are you feeling overwhelmed by regulatory compliance challenges or other issues? Send your stories about facing ethical dilemmas to Senior Writer Meridith Levinson at mlevinson@cio.com.

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Sharing Data, Saving Lives

Sharing medical data among doctors and hospitals in a particular region can save lives and money. But conflicting standards, financial support and privacy concerns are major hurdles.

BY SUSANNAH PATTON

Reader ROI

- :: Why sharing medical data can lower costs and improve health care
- :: How to achieve buy-in from doctors, administrators and other CIOs
- :: Why a small, grass-roots data-sharing project succeeded when more ambitious efforts have stumbled

Dr. John T. Finnell was working the day shift at Wishard Memorial Hospital in Indianapolis last year when a 40-year-old woman was rushed to the emergency room. Finnell, an attending physician in the ER, knew only that the woman had lost consciousness while waiting to see a doctor in an out-patient clinic. He needed more details about her medical history, and he needed them fast. Using information from her driver's license, Finnell pulled up an electronic record detailing recent hospital >>



Health-Care IT

visits. Within 30 seconds, he discovered that she had a seizure disorder and had not been taking her medication.

Without instant access to the patient's medical record, Finnell would have had to administer drugs to temporarily stop her breathing, insert a breathing tube and order a battery of blood work. Her paper file, he says, could have taken hours (or even days) to locate, and the procedures would have put her at risk for brain damage and other complications. "When you're in an emergency and you can't find information about a patient, everybody suffers," Finnell says.

The patient escaped harm in that ordeal because Wishard Memorial and the city of Indianapolis are at the forefront of a national effort to link medical records electronically, and to allow doctors and other health-care providers to share medical data long relegated to disparate databases and dusty filing cabinets. In Indianapolis, the emergency rooms of the city's five major hospital groups share patient data via an electronic medical network. And more than 1,300 doctors in the metropolitan area use an electronic messaging service, which is an extension of the ER system, to share laboratory results and other clinical information about their patients.

Hospitals, clinics and doctors' offices around the country are scrambling to follow Indianapolis's lead to connect patient medical records electronically outside an individual health-care organization's firewalls. From Whatcom County in Washington state to New York's Hudson Valley, efforts are under way to create such regional health information networks. Linking medical data can improve patient safety while lowering spiraling health-care costs. In Indianapolis, the three hospitals linked up to a pilot electronic medical network saved \$26 per ER visit. And as the medical data-sharing system expands, the central Indiana region could save \$562 million per year in health-care costs, says Dr. Marc Overhage, CEO of the nonprofit Indiana Health Information Exchange (IHIE), formed to oversee that region's data-sharing network. Furthermore, a recent article in the journal *Health Affairs* estimated that \$78 billion a year could be saved by moving to electronic medical records and sharing data in regional networks.

Getting there won't be easy, however. The Department of Health and Human Services has earmarked a modest \$50 million to support health-care technology this fiscal year, but that money was squeezed at the last minute from other HHS projects. And although Indianapolis is making progress in linking its medical records, other large projects have been delayed by funding and technology questions (see "How *Not* to Launch a Medical Network," Page 68). Those trying to connect medical data face a number of daunting challenges, including reconciling clashing standards, raising funds and creating business models that will sustain the exchanges once the grant well has run dry. They also face the tricky question of protecting the privacy and security of confidential patient information. In order to succeed, regional data exchanges can learn from pioneers such as Indianapolis, where medical leaders attribute their success thus far to beginning with small projects, creating grassroots support and developing a system that will soon pay for itself.

"No one has the cookbook yet for how best to build a framework for health information networks," says Overhage. "There is much work to be done, but we are starting to come together to answer the most difficult questions."





Dr. Marc Overhage (left), CEO of the Indiana Health Information Exchange, and Edward Koschka, CIO of the Community Health Network, worked together on the Indianapolis region's path-breaking health-care network.

“With the continuing crisis in health-care costs, people are seeing that we have to do something. Sharing our data looks like the best bet.”

—DR. MARC OVERHAGE

If at First You Don't Succeed...

The move to share medical data across communities isn't new. In the early to mid-1990s, many initiatives to build health networks sank because technology was deemed inadequate, doctors were often left out of the planning by vendors and health systems, and the projects had price tags of tens of millions of dollars. The so-called CHINs (community health information networks) failed because they lacked government support and because those who were supposed to use them—namely doctors and nurses—didn't see their advantages.

The health information-sharing networks that are forming today face the same hurdles but have a greater chance of survival because the government and health-care sectors are mobilizing behind the projects. And indeed, most of these regional projects are operating with grant money from nonprofit organizations or the federal government, which has recently thrown its weight behind medical data sharing. Despite the uncertainty of more federal dollars, Dr. David Brailer, who was appointed the national health information technology coordinator in May 2004, has vowed to continue his fight to encourage the health-care industry to adopt digital records that share standards. Such standards would allow health-care providers to share information on drugs, X-rays and treatments, using codes that translate from one hospital to another (see “One Disease, One Name,” Page 69). And private insurers are getting involved; Blue Cross and Blue Shield of Massachusetts, for example, has announced plans to spend about \$50 million to electronically link doctors, hospitals and other health-care providers in three Massachusetts communities.

The biggest obstacle to medical information sharing, however, is the way that most doctors currently practice medicine. Right now, only 5 percent to 15 percent of doctors use electronic medical records (EMRs), and many physicians work in small practices with few extra resources or ties to large medical institutions. Doctors in such small practices don't have the financial incentive to invest in the expensive hardware and software necessary to link into an electronic medical network. So the trickiest part of building these networks is coming

PHOTO BY STEPHEN HILL

up with a business model that motivates physicians and hospitals to invest in electronic medical records systems (see "No Patient Left Behind," Page 24).

"There is great interest nationally for this notion of health information exchange," says Janet Marchibroda, CEO of the nonprofit eHealth Initiative. "But unless you have funding plans and doctors at the table, it is hard to get them going."

The Grassroots Approach

In Indianapolis, the effort to share the data started in 1997, when the city's five major hospital groups agreed to move information from their computers to a citywide medical record that would allow emergency rooms to share patient data. That initial collaboration, the Indianapolis Network for Patient Care, enabled emergency room doctors to easily find information on patients who have visited any one of the hospitals in the area. Last year, the Indiana Health Information Exchange (IHIE) switched on a system that allows clinicians at its five hospital groups to share data from 13 acute-care hospitals and dozens of medical practices, vastly expanding the network that originally served emergency rooms only. There are more than 1,300

physicians practicing in the area, many of whom are exchanging lab and other hospital results over the clinical messaging system, Overhage says. Virtually all are expected to sign up in the near future. The clinical messaging system allows doctors to get lab test results and obtain information including operative reports and hospital visits. For example, if a doctor sees a patient with a bad cough in the morning, he or she can order a blood count and chest X-ray, and then check the results via clinical messaging later in the day.

Overhage and others behind the IHIE say they built support for the system by gaining early grassroots support from doctors and moving slowly. Because only 20 percent of the doctors use EMRs, they developed a process that can deliver the information via the Internet—and even by fax for those who don't yet have Internet access. "If you give physicians good information, they will be drawn naturally to the computer and you will get them on an EMR a lot faster," Overhage says.

Finnell, who has been using electronic records in the ER since he came to Indianapolis nearly three years ago, says the system has changed the way he practices medicine. For example, if he sees a patient for the first time who has diabetes, he now knows from the

How *Not* to Launch a Medical Network

Santa Barbara County, Calif., was the first major region in the United States to begin work on an electronic medical network. But the ambitious project has stumbled because of insufficient grassroots support.

IN 1999, the county of Santa Barbara, Calif., won a \$10 million grant from the California Health Foundation to build the nation's most ambitious electronic medical network, linking medical information from about 300,000 patients with thousands of caregivers in hospitals, clinics, pharmacies and doctors' offices throughout the region. In anticipation, doctors, hospital administrators and public health officials crowded into auditoriums in the coastal city of Santa Barbara to see demos of the software and hear the latest plans for the network.

"There was great excitement for this project," says Phillip Greene, chair of the data-exchange project and deputy director of the Santa Barbara Regional Health Authority.

More than five years later, the Santa Barbara County Care Data Exchange has yet to start operating. The network was originally scheduled to start up in 2002, but that date has been put off several times as the project ran into both technical and political difficulties. "It's been six years now, and at this

point, a lot of people have forgotten about us," says Mike Skinner, the data exchange's executive director since last July. Skinner expects the project to be up and running in the first quarter of 2005, after physicians finish testing the system. He says he has enough grant money to make it through the first year of operation, but that "until we can demonstrate real benefits, it's very difficult to develop the financial model."

So, what has stalled Santa Barbara's data-sharing project?

In contrast with the Indiana Health Information Exchange, which started small and linked emergency rooms only, Santa Barbara's project began with a grand vision. The system, created with help from vendor CareScience, was designed to pull together electronic medical records from various data owners within the community, using peer-to-peer technology similar to that used by Napster. Dr. David Brailer, now the nation's first health information technology coordinator, was the chairman and CEO of CareScience and the visionary behind the ambitious plan.

"When you're a pioneer, you stumble from time to time," says Dr. Ronald Paulus, chief health-care officer at Quovadx, which bought CareScience in September 2003. "Santa Barbara was a wonderful vision. In hindsight, the magnitude was in and of itself a motivator and a barrier." Paulus says the large scope hindered the project's progress because doctors got restless, and some lost interest while waiting for it to start. In hindsight, starting smaller on a more grassroots level would have been a more effective approach.

Paulus says he has learned from the experience that those in the community need to drive the project, not the vendor or the entity that provides the grant funding. "We were passive as a community," Greene says.

Greene and Skinner say that despite the missteps, the project has a chance of success. But until it's up and running, they can't be sure. "At some point, we're going to have to see if the community wants to play or not," Greene says. —S.P.

electronic record about recent tests, blood sugar levels and hospitalization. In the past, he would have spent hours quizzing the patient about information he might not have remembered and requesting patient files from various locations. Treatment would have been slower and potentially less effective.

Finnell acknowledges, however, that many of his colleagues can't find the time to log on to a computer to retrieve medical information. Those designing an electronic records or information-sharing system, he says, need to understand how doctors currently practice medicine, or doctors may revolt against the system. That may mean using paper printouts of the medical records if necessary. "If you all of a sudden get rid of paper and tell them they have to log on to a computer, I'd say a good percentage of them will say no thank you," he says.

Doctors aren't the only barriers to electronic information sharing. Over the past four years, those working to build Indianapolis's medical data exchange have faced multiple roadblocks. According to Edward Koschka, CIO of the Community Health Network (a group of five hospitals in the Indianapolis area), the clinical messaging project was "doomed for failure" at three points over the past two years. The first time was when hospital CIOs met in June 2002 to talk about collaborating. "Everyone said, Wait a minute—this conflicts with my strategic plan for my hospital," Koschka recalls. His team devoted three meetings to convincing the CIOs that they needed to collaborate on clinical messaging in order to reduce costs. Second, in January of 2003, the hospital CFOs proclaimed that there was no hard dollar ROI for the project and recommended to their CEOs that they not proceed. Those CFOs were finally convinced to go along after hearing from the hospitals' CEOs about how the system would add value down the line, even if the immediate ROI was difficult to prove. Third, the hospitals balked at a funding model that required \$2 million from each of them up front. They agreed ultimately on a plan that required a smaller up-front commitment from them, no payments from physicians, and a business model that will eventually be sustained by fees from laboratories and other service providers.

"We learned from all of this that things don't happen overnight," Koschka says. "There are all sorts of reasons you shouldn't do this, and we had many naysayers in this city. To succeed, you need physicians, CEOs and CIOs who embrace the vision."

In order to convince doctors to use EMRs, Koschka chooses his IT champions carefully. "When CIOs speak to physicians, they often tune us out," he says. "When a doctor leader speaks to them about technology's benefits, they will listen."

One Disease, One Name

Adopting the same set of standards will make it much easier for health-care providers to share medical data

WHEN THE CEO of a prominent high-tech organization sought treatment at Stanford University Hospital, he was shocked to find that the teaching hospital had no way of accessing his test results from nearby Sutter Health clinic. Even though the hospital and clinic are literally across the street from each other, the test had to be repeated.

Stanford and Sutter have since built an interface that allows them to share their test data, but the CEO's story illustrates a nationwide dilemma: Most doctors, hospitals and medical facilities are still talking different languages. "Our inability to integrate not just between different groups, but even within ourselves, definitely impacts patient care and patient safety," says John Hummel, CIO of Sutter Health. Studies have shown that increased use of standards to transfer laboratory and other medical data can also save money by cutting down on repeat tests and other redundancies.

Fortunately, a national movement to promote standards in medicine is gaining momentum. Among these standards are: SNOMED CT, a medical terminology used for laboratory results as well as nonlaboratory interventions, diagnosis and nursing; Health Level Seven (HL7) standards communicate demographic information about patients, immunizations and clinic visits; and laboratory Logical Observation Identifier Name Codes (Loinc) further standardize the electronic exchange of lab test orders and prescription drug label information.

Dr. David Brailer, the health information technology coordinator for the U.S. Department of Health and Human Services, is working to come up with incentives in Medicare and other federal programs to encourage the use of these standards throughout the health-care sector, and the federal government has mandated their use in government institutions. "It will take time because of entrenched habits, but people will see how much more efficient we can be with standards," predicts Dr. Marc Overhage, CEO of the Indiana Health Information Exchange. —S.P.

The Elusive Business Model

When looking for a reason to quash a data-sharing project, naysayers will invariably point to the issue of money. Indiana's health-care network, which costs about \$1.5 million a year to operate, has so far been largely funded by a series of federal grants, as have all of the other regional health information organizations around the country. Recently, however, IHIE has developed a business model that will eventually allow the system to pay for itself. IHIE charges laboratories roughly 80 cents for every lab or radiology result requested by doctors and has worked out a system in which the area's hospitals contribute to the system. Overhage says IHIE started sending out bills shortly after it incorporated last November; he expects to break even this year.

By contrast, the Santa Barbara County Care Data Exchange received a \$10 million grant from the California Health Foundation in 1999, but it has not yet found a sustainable financial model. It was supposed to go live in 2002, but now the projected date is sometime in 2005. "Until we are able to demonstrate real benefits, it's very difficult to develop this financial model," says Mike Skinner, executive director of the



Keys to Data-Sharing Success

1 Start with small projects. In order to convince users to share their data, you'll need to provide some positive results from pilot projects before getting large numbers to sign on.

2 Involve all levels of participants from the start. Create a grassroots movement among the users (doctors and nurses).

3 Develop a business model so that a project can pay for itself after the initial grant funding is gone.

4 Encourage doctors and nurses to share information by making it easy to do. If that process is cumbersome or time consuming, many won't bother to use it.

5 Stress the business case—the health-care benefits—rather than the technology. And choose IT champions for the project from among your physicians.

Santa Barbara project, which is still in a testing phase.

Dr. Marc Pierson, a vice president on the executive team at Peace-Health St. Joseph Hospital in Bellingham, Wash., says that those creating medical information exchanges need to prove their value before asking for money. In Whatcom County, Wash., where Pierson oversees a health information network that links 300 doctors, caregivers used the system for free for three years. "You can't charge doctors for an idea," he says. Now, doctors pay \$71 per month to share medical data and receive lab information online. Only three of the 300 doctors who tried the system for free dropped out once they were charged, because they helped create a system that works well for them, Pierson says.

Outside of Whatcom County, however, getting skeptical doctors to pay for sharing data is a major obstacle to regional networks. Doctors must pay anywhere from \$10,000 to \$30,000 to buy hardware and software and transfer their paper records to an EMR, says Dr. David Bates, chief of general medicine at Brigham & Women's Hospital in Boston and a member of the organization working toward a statewide clinical data exchange in Massachusetts. Bates expects that insurers will reward doctors who share electronic records by paying them higher rates once they've installed the systems. John Tooker, executive vice president and CEO of the American College of Physicians, which represents the country's internists, agrees that it will ultimately take financial incentives—such as low-interest loans, tax credits or performance bonuses—to encourage more doctors to use the new data-sharing exchanges.

The Patient Privacy Conundrum

Even if these exchanges find a way to overcome the financial obstacles, many caregivers remain concerned that linking medical records will erode a cornerstone of American medical care: patient privacy. Doctors generally are given passwords to enter EMRs, and patient information transferred in messages has to be encrypted under the Health Insurance Portability and Accountability Act. But with more patient information going online and into databases, there are more opportunities for the information to get into the wrong hands.

In Indianapolis, any transmissions containing lab results go only

to the physician who orders them, Overhage says. In that sense, privacy protection is the same as with paper files; it's up to the caregiver to keep that information private. "We are scrupulous about who uses this data," he says.

Overhage acknowledges, however, that any breach could be devastating. "The thing that will shut us down is some violation of a patient's privacy," he says. Koschka echoes that concern, noting that the question of who will have access to the citywide repository of medical information "hasn't been resolved." While he says he would like to give physicians access from their offices to the citywide repository, that information is currently available only to ER doctors and (in aggregate form) to qualified researchers. And while encryption and other technologies can keep data private and secure, it's ultimately up to the masses to decide how much patient information should be shared by doctors, nurses, administrators, claims processors and registration clerks in different hospitals and offices.

For Dr. Pierson in Whatcom County, the key to guaranteeing patient confidentiality is to offer patients and providers an audit trail of who has looked at the records. Under Whatcom County's "shared care plan," doctors and patients and their families have access to computerized records, and patients can note changes in symptoms or medications. If there is a breach in patient privacy, those responsible must be harshly punished, he says. "If someone breaches, they lose their job. There have to be significant penalties."

Despite privacy concerns, Overhage expects to see a continued push toward a national health network that will allow hospitals and physicians across the country to share patient data. In Indiana, he expects to expand the clinical messaging system to doctors in a larger part of the state this year. And the system itself is expected to include more types of data and information that doctors need. For example, doctors could start receiving electronic "clinical reminders" to let them know which of their patients need flu shots.

"People are seeing that with the continuing crisis in health-care costs, we have to do something," Overhage says. "Sharing our data looks like the best bet." **CIO**

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How to Develop Your Team

CIO Executive Council members are worried about a dearth of higher-ed graduates with that perfect combination of IT and business skills (see "Findings," this page). And with executives eyeing outside providers as alternatives to internal IT, CIOs had better get serious about improving the business and leadership skills of their staffs. At a recent CIO Executive Council meeting, members discussed the various strategies they use to keep their staffs on the leading edge.

1] Leadership by rotation. John Mullin, CIO at the Georgia Institute of Technology, sponsored the Office of Information Technology Professional Leaders Program. This 18-month rotational program teaches six top performers in the IT department on-the-job management skills, including leadership, strategy, project management, HR finance, communication, and change management.

Participants spend the first two weeks of the program shadowing the directors of each of the seven



JOHN MULLIN

areas within IT. After that, participants are given an extended assignment in one or some of these areas. Projects are designed with the intention of exposing staff to new skills. For example, a recent project focuses on developing an IT budget that correlates with a three-year strategic plan and specific IT initiatives. Participants use PeopleSoft to compute the budget and then create and fund different IT positions to meet the increased demands. Throughout the rotation, participants meet biweekly with mentors who work outside of the assigned area to help track their progress and address any difficulties as they arise.

For those employees not selected for the formal program, Mullin uses "point assignments," in which staffers are given a new task for a few days at a time or even six months. "The most successful ad hoc point assignment was when we rotated IT operations staff from the network center into the customer support organization," Mullin recalls. "The network center staff came to the rotation with strong technical expertise, but after spending time with the customers, they gained a deeper understanding of how customers

actually use the technology and are better prepared for growth outside of their technology silo." Mullin is proud to report that participating staffers have been promoted to higher positions in the department because of new skills gained through these assignments.

2] Partner with external mentors. Steve Strout, VP and CIO of Morris Communications, cre-



STEVE STROUT

ated a growth opportunity for high-potential staff members in summer 2004. Realizing that IT is a common bond regardless of industry or organization, he reached out to local businesses about starting a mentoring relationship. His motivation in creating this program was to generate a sense of community and networking among his IT staff. "I wanted them to realize that there are other IT people out there doing things differently but successfully," recalls Strout.

Four to eight Morris IT employees participate in the mentoring program. Strout targets specific external organi-

Continued on Page 74

FINDINGS

THE FUTURE OF the U.S. IT workforce looks pretty bleak, according to an October 2004 CIO Executive Council poll of 162 members.

81%

of respondents were concerned about the future competitive advantage of the U.S. workforce in the global IT marketplace.

57%

of respondents said today's U.S. college graduates are only somewhat knowledgeable enough to meet today's IT and business needs.

57%

of respondents said a lack of integration between business and IT skills is the biggest problem with today's U.S. IT education programs.

[PEER COUNSEL]**Q:**

How are private-sector companies and academia collaborating to improve the skills of IT staff?

A:

AT A RECENT COUNCIL EVENT, the CIO of a manufacturing company and I were discussing the issue of open source and the challenges of this new technology. We talked about a potential collaboration between students at Oregon State University, who had expertise in open source, and the CIO's IT staff, who were looking to learn more.

As a result of this initial conversation, I called on Oregon State University's Open Source Lab (OSL) to present its Open Source Boot Camp at the manufacturing company in early 2005. The boot camp addressed issues such as indemnification and open-source licenses, and also described some wins and losses of open-source deployments in the business world. The objective was to show this company how to get involved with open source and mitigate any risks involved in deployment. In exchange for the boot camp, the manufacturing company covered the OSL's travel expenses and made a donation to the OSL, which will go to support the open-source community at large. (To learn more about open source, read "It's Raining Code," Page 52.)



CURT PEDERSON, vice provost for information services and CIO at Oregon State University

zations known for their success in technology. The relationship, typically between a Morris midlevel professional and a manager from an external organization, is not about a transfer of technical skills but is focused on leadership and management skills. Morris staff can also serve as mentors to staff at the local organization. Depending on personal preferences, participants meet for lunch or a drink after work while others send e-mail or talk on the phone. There is no time limit on how long the mentoring relationship will last; if the match is a good one, however, Strout hopes it lasts a lifetime.

Strout notes that the most successful mentoring relationship is one that "gives participants the ability to view things from different perspectives and then respond in their own jobs." Strout plans to incorporate mentor feedback and opinion into the organization's 360-degree performance review program that is targeted for this year and to reach out to more local organizations, including higher-ed, to widen the mentoring pool. (See "Create an IT Curriculum," Page 76, to learn about another of Strout's leadership programs.)

3] Create support and incentives for technology training.

As of this year, Moti Vyas, CIO of Viejas Enterprises, a Southern California tribal casino and outlet mall, requires his staffers to attend 40 hours of classroom training annually to improve their technology skills and to prepare them for new project deployments. Forty hours may seem like a lot, but the staff doesn't complain: Annual and quarterly bonuses are determined, in part, by successful completion of technology training, and Vyas provides employees with time off and travel expenses as long as the course matches the business objectives and time line. Never one to preach what he doesn't practice, Vyas also has to fulfill the 40-hour requirement.



MOTI VYAS

Staff members also have the opportunity to lead monthly seminars on a specific technology topic. Audience members evaluate the performance in real-time to determine whether the presenter is eligible for a spot bonus award. For extra consideration for the quarterly incentive program, the presenter may demonstrate to management how the material has helped other team members in doing their jobs and implementing projects.

—Carrie Mathews, member services manager,
CIO Executive Council



HELPFUL HINT

Steve McDowell, CIO at Holiday Retirement Corp., a retirement home operator in the United States and Canada, uses specific contract language to formalize knowledge transfer from his vendors to his IT staff. McDowell includes it as a separate line item called "knowledge transfer" with a specific allotment of time. One advantage of separating the knowledge transfer time from other vendor tasks is that vendors are not able to use this allotment to make up for other project delays.



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[EXHIBIT A]

Create an IT Curriculum

CIO Steve Strout proves that you can send your IT employees back to school—and reap some benefits from it

Steve Strout, VP and CIO at Morris Communications, a \$533 million media company, knew he had created a good leadership program at his previous employer. So when he arrived at Morris, he modeled the Morris Leadership in Technology program after the ideas that had served him so well before, customizing the curriculum along the way. Strout brings in venture capitalists, attorneys and other professionals to lead courses on various topics. Although they do not get paid for participation, these experts get exposure to up-and-coming managers who could use their services in the future.

In summer 2004, six high-potential candidates from Morris's IT organization started the 12-month program, which consists of a three- or four-day session per quarter geared toward bringing a well-rounded set of leadership skills to IT professionals. While Strout does not guarantee a specific career path for graduates of the program, whose managers choose them to participate because of their outstanding performance, he does think hard about how to place them.

You are creating people who are more productive, more intelligent and more empowered to lead, he says. "If you don't have a position for them in the organization where they can make an impact, then they will leave."

—C.M.

STROUT'S COURSE CURRICULUM:

1. **TECHNOLOGY LEADERSHIP**
Sessions are titled Legal Issues Revolving Around Technology, Market Changes and Industry Trends, and Insights on What Technology Advances are on the Horizon
2. **BUSINESS LEADERSHIP**
Sessions include All Things Financial, Thinking Like a Venture Capitalist and Knowing What the Competition Is Doing
3. **LEADING PEOPLE AND CULTURE**
Sessions include Working with a Geographically Diverse Workforce, Making Work Fun, and Sparking and Improving Creative Innovation
4. **SOFTWARE DEVELOPMENT LEADERSHIP**
Sessions are titled Standards, Enterprise Architecture and Building Business Value

COUNCIL NEWS

Most CIOs would agree that candidates with the right mix of business and technical skills are not exactly spilling out of academia. The CIO Executive Council is working to change that. The Council's Task Force on IT Staffing has just released a report that details CIOs' current and future staffing needs and is now planning an "influence campaign" to guide undergraduate and graduate programs to shape their curricula accordingly. Our message to academia is fairly straightforward: We need IT professionals with leadership skills, business knowledge and an aptitude for working in a global environment. Stay tuned to these pages for reports on our progress.



—Barbara Kunkel, CIO and IT director of Nixon Peabody, and chair of the CIO Executive Council Task Force on IT Staffing

The CIO Executive Council is a professional organization for CIOs founded by CIO's publisher. To learn more about the Council, please visit www.cioexecutivecouncil.com or contact Managing Director Martha Heller at mheller@cio.com or 508 988-6738.

ON THE JOB

My Favorite Interview Questions

EVEN WITH A GREAT STAFF development program in place, you'll need to make sure your new hires are up to par. But the problem with new hires is that you don't really know them until they've been on the job a while. Council members offer up a few good interview questions to separate the proverbial wheat from the chaff.



From **BILL DEAM**, executive VP and Global CIO of Quintiles Transnational:
Describe characteristics of a leader you admire.

GERRY McCARTNEY, assistant dean of technology at the Krannert School of Management, Purdue University:

Describe how you use one-on-one versus group meetings with your direct reports.



From **RICK ROY**, CTO of CUNA Mutual Group:
If you could pick any role, any company and any level, whose job would you pick and why?

From **JEFF O'HARE**, senior VP, corporate IT, Cendant:

Tell me about the biggest mistake you have made in your career: what it was, what the ramifications were, how it affected your career and how you could have avoided it.

From **HANK ZUPNICK**, CIO of GE Real Estate:

Tell me about a project or initiative that came up short on your watch.



From **JESUS ARRIAGA**, VP and CIO of Keystone Automotive:
How have you dealt with an irate user?



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FROM THE PUBLISHER

The Myopia of CEOs

Corporations are flush with money. You wouldn't know that by looking at wages or technology budgets.



Technology infrastructures will fail at an ever-increasing pace in the coming 12 months. And CIOs aren't the ones to blame.

The culprits? Look no further than to the CEOs and CFOs who made myopic, self-serving decisions from 2001 to 2004. During that time, in their efforts to rein in tech expenditures, they issued marching orders to "do more with less." Such orders typically had 90-day horizons, enabling those same executives to meet Wall Street expectations.

By doing so, they would insure their continued employment or negotiate extravagant severance packages, while nixing decent wage growth for employees.

Need proof?

Representatives of Northeastern University's Center for Labor Market Studies have penned a white paper entitled "The Unprecedented Rising Tide of Corporate Profits and the Simultaneous Ebbing of Labor Compensation," in which they compare the rebound from the 2001 recession to rebounds from eight previous recessions dating back to 1950. In rebounds from those previous recessions, 19 percent of the growth in national income two years from the end of the recession was achieved via corporate profits. But 60 percent was reflected in employee wage growth.

How did the captains of American industry manage their way out of the 2001 recession? More than 40 percent of the national income growth has been accounted for by bulging corporate profits. That represents a 55-year high. What about wage growth for employees? That dropped to 39 percent of national income growth, a 55-year low.

Corporations are swimming in cash, yet aging tech infrastructures are getting older. As infrastructures continue to age, those CEOs who are more intent on making their companies "compliant" rather than "competitive" will be called before shareholders to explain why the tech lights went out.

I guarantee it.

Gary J. Beach

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CIO Leadership Conference:

Developing the Right Stuff

May 9 & 10, 2005 • The Charles Hotel • Cambridge, MA

A major concern of CIOs across business, industry, government and non-profit organizations centers on developing the next generation of IT leadership. As outsourcing IT becomes more rampant, where will this next generation come from? What new skills will they need to be effective business partners as well as leaders of IT organizations? How do we identify the best candidates? How do we ensure they have the right training and mentoring?

CIO Magazine, in conjunction with the CIO Executive Council, addresses this pressing issue in the CIO Leadership Conference: Developing the Right Stuff. We'll bring together CIOs who have worked to elevate the CIO position within the enterprise, who continue to blaze new trails and meet new challenges, and who are defining what it will take to be the CIO of the future. We'll combine them with today's "up-and-comers" – the senior IT staff that will take up those challenges, and together we'll forge a set of goals, and a roadmap to achieve them.

F. Warren McFarlan,
Harvard Business School's
Baker Foundation Professor,
will deliver the opening keynote
The Once & Future CIO
and serve as conference moderator.

Clayton Christensen,
Author of *The Innovator's Dilemma* and
Harvard Business School Professor,
will deliver the closing keynote
Seeing What's Next.

For more information and to register, visit

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We'll also recognize those future leaders—who have been identified and sponsored by the CIOs of today's leading organizations—with *CIO Magazine's* 2005 Ones To Watch™ Award during a special reception, dinner and awards presentation. **This year's distinguished Judges are:**

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A Roadmap for the Successful CIO

The CIO role demands a heady roster of skills and responsibilities: communication, motivation, political savvy, "vision," accountability, productivity (not to mention a tight grasp of the technological bleeding edge). Its complexity is enough to make up-and-comers and seasoned veterans alike consider changing careers. To help put the job in perspective, and help you identify areas where you need experience or improvement, the CIO Executive Council has created a visual roadmap to CIO success.

Identifying and Cultivating Future IT Leaders: Three Case Studies on Leadership Development

A CIO's greatest asset is a strong, loyal management team that possesses a good mix of technology skills and business experience. According to the CIO Executive Council's latest findings, there are too few IT professionals in the labor pool—at any level—with the necessary business acumen, technological foundation, and global perspective to support a CIO's overall strategy, let alone advance to an executive level IT position. What are some of the best approaches and practices to getting a more complete program of development for you and your staff? Three successful CIOs, members of the CIO Executive Council, talk through their strategies for identifying future leaders and developing their IT, business and communication skills—and share what

they think helped their own rise through the ranks.

1. Developing the IT Skillset
2. Gaining the Business Acumen
3. Understanding the Value of Communications

Technology Leadership

Some IT staff are more suited to be future CTOs than CIOs, and that's not necessarily a bad thing. How do you effectively channel and develop people who not only have a deep understanding of technology, but have solid and innovative ideas on what technology can do for the business? What are successful methods and mechanisms for tracking emerging technologies and trends and evaluating them against business needs? Our panel gives us the benefit of their experience and opinions.

Financial Leadership

Your organization wants financial accountability and measurable results from all its departments—and IT is no exception. Members of the CIO's staff need to have a firm grounding in finance, to make the business case for new initiatives, to know how the organization will measure ROI, and to articulate that throughout the firm. Mastering the skills in this area goes a long way to making it easier to talk to the Board of Directors, the CEO, CFO and business unit managers—which in turn should make it easier to maneuver IT into closer alignment with their needs.

Business Leadership I: Uncovering, Understanding & Managing Expectations

You can't manage what you don't know, and legions of CIOs bemoan the difficulty of figuring out what their organization's senior management and business units really want and expect from IT. Uncovering, understanding and then managing expectations is a continuous process of mutual education and communication. Our CIO panelists share the lessons they learned from their alignment victories—as well as their defeats.

Business Leadership II: Balancing Innovation and Cost Controls

Today's business climate now demands innovation and growth—but not at the expense of continuing to improve productivity, increase efficiency and decrease costs. It's a delicate balancing act as CIOs help find ways to affect the bottom line by shoring up existing business, strengthening customer ties, entering new markets and integrating new business acquisitions. Our panel of CIOs considers how to fuel innovation and enable growth in a business environment where resources are still constrained.



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Dr. Marc Overhage (sitting), CEO of the Indiana Health Information Exchange, and **Edward Koschka**, CIO of the Community Health Network, agree that any violation of patient privacy could shut down their data sharing system.

64 | SHARING DATA, SAVING LIVES

In Indianapolis, the emergency rooms of the city's five major hospital groups share patient data via an electronic medical network, and more than 1,300 doctors in the metropolitan area use an electronic messaging service to share laboratory results and other clinical information about their patients. Such regional linking can improve patient safety while lowering spiraling health-care costs. Plenty of hurdles remain: clashing standards, difficulties in raising funds, creating business models that will sustain the exchanges, as well as privacy and security issues. But Indianapolis has succeeded thus far by starting with small projects—initially, it tackled only emergency room linkage. And it eschewed top-down and vendor-driven approaches that have caused data-sharing efforts to stall elsewhere.

By Susannah Patton

38 | SPECIAL REPORT: ENTERPRISE ARCHITECTURE A NEW BLUEPRINT FOR THE ENTERPRISE

ENTERPRISE ARCHITECTURE used to mean standardization and CIOs acting as the technology police. Today, it's the overarching plan of a company's data, business processes and IT assets, how they're used, and how they should be built and shared. A good EA should guide the reuse of IT assets and the sharing of common methods for project management and software development. The end result reportedly is IT that's cheaper to run, more strategic, more responsive and better aligned with the business—all the things CIOs (and CEOs and CFOs) desperately want. EA has always been difficult to implement and prone to failure. But that's changing because of two emerging technologies—service-oriented architecture (SOA) and process-event monitoring. *By Christopher Koch*

46 | WANTED: ENTERPRISE ARCHITECTS

WITH ENTERPRISE ARCHITECTURE poised to become the new governing model for IT system design and development, CIOs will need to hire enterprise architects to ensure that when IT decisions are made, their impact on the entire organization is kept firmly in mind. The architect needs to be a generalist, with a good understanding of applications, data and hardware. The ideal architect has extensive IT and business experience and a passion for problem solving, is politically savvy, and possesses an extrovert's acute sensitivity to other people's reactions and needs. Although it's tough to find all that in one package, CIOs had better get busy; finding that perfect person will only get harder. *By Ben Worthen*

52 | IT'S RAINING CODE! (HALLELUJAH?)

GIVEN THE LOW BARRIER to entry, it's easy to understand why companies are tempted to use open source for, at the very least, those projects that fall shy of mission-critical. For CIOs nervous about the support and licensing issues that surround open source, well-known vendors are increasingly releasing some of their own code to the open-source community. Of course, if you're looking at open source precisely because you want to get away from those vendors, there's an alternative: a cooperative of like-minded, open-source-loving CIOs just waiting for you to join. The options for using open source have never been greater, and you owe it to yourself—and your company—to take a close look. *By Christopher Lindquist*

58 | ASK THE ETHICIST

IN THE PAST, few CIOs acknowledged the existence of an ethical dimension to their jobs because many of them didn't believe developing or managing technology demanded value judgments. But as stewards for the systems that process and store customer, employee, financial, operational and transactional data, CIOs are increasingly being asked to make ethical calls. For example, they must decide whether to allow the government access to customer data (à la JetBlue) even though that access may violate their companies' privacy policies. The CIO is also the executive the CEO will turn to if he wants to erase a digital trail of personal or corporate misconduct. In this story, Larry Ponemon, an expert on business ethics and compliance risk management, provides answers to actual ethical dilemmas posed by CIOs in the areas of Sarbanes-Oxley compliance, offshore outsourcing and accounting practices. *By Meridith Levinson*



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